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133MHz Pentiums

Forget entry-level systems — now you can buy a superfast 133MHz Pentium PC with full multimedia from just £1,469. *PCW* tests 17 of the latest models, plus a competing Cyrix machine.

PCW **Cover Photography** David *Whyte* **Screen Image** Andy *Parker*

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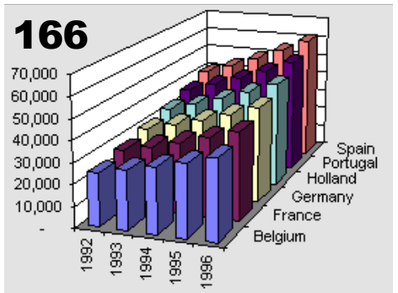

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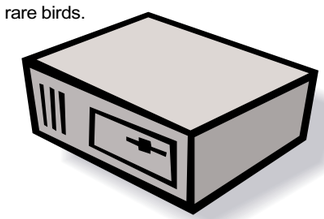

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PCW Cover Disk

Robin Nixon introduces a crossword puzzle solver, a powerful address book, a taxing game, and a visual puzzle.

Smart Address

When Oakley Data Services released the first version of this powerful address book program, it was highly-acclaimed throughout the industry. And now, having improved the product many times over, *PCW* has the new version.

Whatever your contact management requirements, you will definitely find this program has everything you need. Once you start using it, you'll wonder how you ever managed without it.

● *Minimum Requirements: Windows 3.x, 4Mb RAM, VGA display.*

Thingies

"If you see it, say it", is the well-known catch-phrase from the TV programme of a similar name.

With this great lateral-thinking set of puzzles, you are challenged to decipher the word or catch-phrase hidden in the pictures you are shown. Some are easy, some are very hard, and some just make you groan. You'll love it!

● *Minimum Requirements: DOS, 2Mb RAM, VGA display.*

Squarez

Another great, brain-teasing program. Can you solve the puzzles within the time limits? As with Thingies, you can run this program from DOS.

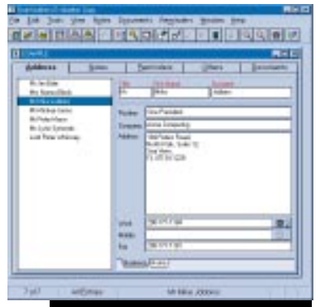
● *Minimum Requirements: DOS, 2Mb RAM, VGA display.*

Puzzlex

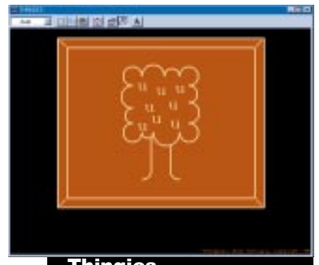
An ideal companion for solving tough crossword puzzles. It finds words that match given patterns, so you can solve the one clue that's been frustrating you.

It works, and it works well. In fact, it can be tempting to use this program to solve the entire crossword puzzle. Try to resist the temptation!

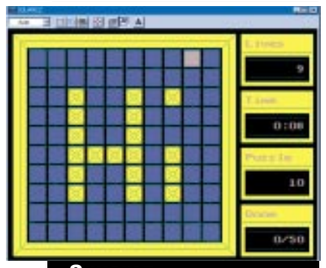
● *Minimum Requirements: Windows 3.x, 4Mb RAM, VGA display.*



Smart Address



Thingies



Squarez

Puzzlex

To install the Cover Disk programs, from File Manager or Windows 95 Explorer, double click on the program displayed in your floppy disk root director and follow the instructions.

PLEASE READ THIS

If you have problems with the Cover Disk such as receiving a "Cannot read from drive A" error, please return the disk to the duplicator: TIB PLC (PCW), TIB House, 11 Edward Street, Bradford BD4 7BH (who may be contacted on 01274 736990) together with a stamped addressed envelope and two 25p stamps. Where it is a duplication fault, the postage will be returned along with a replacement disk.

If your problem is not due to a faulty disk, and a phone number is shown for the publisher of the program in question, then it will probably be quicker for you to call them first as they will be able to provide direct assistance on their own programs faster than might otherwise be possible.

Alternatively, ring our floppy cover disk hotline on weekdays between 10.30am and 4.30pm on 0891 715929. Calls are charged at 39p per minute cheap rate and 49p at all other times.

The *PCW* cover disk is virus checked at every stage of production. However, *PCW* will not accept liability for any problems arising from the use of the disk. Installing or running any of the programs on the disk indicates your agreement to this condition.

You are advised not to install any software on a networked PC before checking the disk. While *PCW* maintains a high standard of quality control, disks may be damaged in transportation. Check the disk's shutter before inserting it in the drive by sliding it to the left and allowing it to spring back.

PCW Interactive CD-ROM

This month's packed PCW Interactive offers the best in PC and Mac entertainment, applications, utilities and much more besides.

MAIN FEATURES

Demos

● **Audio**: We have got together with two record companies to bring you four great music tracks. The tracks are from Wob, Jana Heller, The Well Oiled Sisters and Suzanne Chawner.

● **B-plan Planner**: A neat program that will aid you and your company when planning is on the schedule. If you're not good at planning your life manually, then this will definitely lend a hand.

● **GPSS**: GPSS stands for Global Positioning Satellite Software and it's an amazing piece of software. Used in conjunction with a GPS receiver and a PC, you can track your position anywhere on the earth to within a few metres. This software shows you maps of the UK and even has voiceover, so you can also hear where you are.

● **Invoice 96**: The latest version of the powerful program from Micro 90. This accountancy package will allow you to keep all your invoicing details up-to-date and simple to understand. If you've used and liked this program in the past, you will be even more impressed with this updated version.

● **Magic Player**: One of our younger readers designed and wrote this small-but-sweet player. He even created the audio file too.

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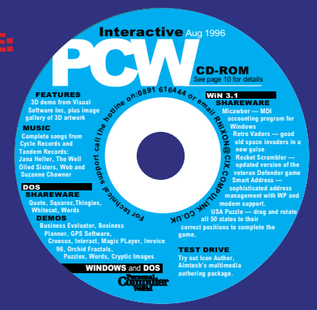
PCW INTERACTIVE: Entire Contents List



Audio - Four great music tracks
Cover disk - The contents of this month's floppy disk

DEMOS
B-PLAN Planner - planning software
B-Plan Evaluator
GPSS - Navigational utility
Interact - Create your own interactive questionnaires and training packages
Invoice 96 - Invoicing package
Magic Player - Audio player
Orchid Fractals - Fractal creator
Puzzlex - This word program will solve your crossword clues
Words - Yes, more words to ponder over
Icon Author - A superb multimedia authoring package
3D Software Showcase - The latest advances in multimedia
Gallery - Collection of images
Magazine - Files relating to magazine articles

SHAREWARE FOR DOS
Quote of the day - A different quote for each and every day
Squarez- This will send you round the bend
Thingies - Lateral-thinking puzzles
Whitecat- A textual cataloguing system
Words - Oh no, not more word programs!

F O L D H E R E

WINDOWS 3.X SHAREWARE
Croesus - A powerful home finance and bank account management system
Micawber - Home accounting at its best
Retro Vaders - Classic space invaders clone
Rocket Scrambler - Defender-type shoot-em-up.
USA Puzzle - Test your general knowledge about the States.
Goodies

REGULARS
Video for Windows 1.1E
Microsoft Super VGA drivers
CD-ROM test

MACINTOSH
Huge collection of the latest Shareware and demos

● **Minimum requirements:** 4Mb free RAM (some can be in a permanent swapfile), 386SX/33 processor, Windows 3.1. Users with less than this should be able to run all the DOS programs on the CD-ROM directly from DOS or Windows (rather than using the front-end). For best performance we recommend: 8Mb installed RAM, 486 DX/50 processor, Windows 3.11 or Windows 95.

CONTINUED FROM PAGE 11

● **Orchid Fractals:** Fractals are computer-generated images that are simple to create, yet can become beautifully complex patterns. This program allows you to select the views and adjust the way fractals are created.
● **3D Software Showcase:** Here's an interactive guide to some of the latest achievements in the field of multimedia. There are animations, videos and loads of images. The best thing to do is check it out for yourself.
● **Macintosh**: 25Mb of the very best new games and utilities.

Configuring Video for Windows

If you select the "New users start here" button, on the first page of *PCW* Interactive you'll have the opportunity to install the latest version of the Video for Windows runtime, so that you can view the digital movies on the CD. If you haven't installed Video for Windows from a *PCW* Interactive CD before, then you should install this new version as it contains the latest drivers which deliver higher quality, a larger size and a faster playback rate. If you don't install the new version, some videos will display the warning "Cannot display this video", or similar.

There are also some extra buttons on the Video for Windows page, which allow you to fine-tune your PC's performance without having to leave *PCW* Interactive or restart Windows. In particular, you can choose to have digital movies played back on your PC at full-screen resolution, without having to resort to hardware add-ons such as MPEG cards.

But remember: when you exit from *PCW* Interactive, if you leave the option for full-screen video selected, then all video in other applications will also be full-screen. If you don't want this, re-run *PCW* interactive, select the "Windowed" option and quit again.

If you're fed up with your Windows wallpaper, you can redecorate with Cryptic Images. Sit back and learn about the latest developments in multimedia or just relax to the sounds of Jana Heller, The Well Oiled Sisters or Wob. Other treats on offer include an accountancy package, navigational software and a planning program, all absolutely free

Testing your CD-ROM

If you suspect your CD-ROM may actually be faulty or damaged you can run the file CDTEST.EXE in the SYSTEM directory of the CD-ROM. The program will then examine every byte of data in the PC partition of the disc to see if it can be correctly read. The process takes up to 35 minutes and generates a verification code if the disc passes the test. If the CD-ROM fails this test try cleaning it with a light solution of washing up-liquid, dry it with a lint free cloth and run the test again. If it still fails, return your CD-ROM to the magazine for a free replacement.

You are free to copy the CDTEST.EXE program to your hard disk in order to test other CD-ROMS, as long as it is not distributed in any way. If you are running CDTEST from your hard drive you need to specify the CD-ROM drive to test, as follows:

```
CDTEST D:
```

Note: We offer this tool purely as an aid to diagnosing possible faults, some of which may occur because an older version of MSCDEX.EXE is in use and not because of a faulty CD-ROM, and disclaim any responsibility for any erroneous error reports that it may generate.

IMPORTANT— READ THIS!

● **General Protection Faults**

If you receive General Protection Faults

when running PCWI, or playing any digital videos it is probably because your graphic display driver may not be 100 percent Microsoft compatible. The answer is therefore to install one of Microsoft's own drivers, as follows, (But NOT if you are using Windows 95, as the drivers supplied with it are even newer than the ones on this disc):

1) Run “Windows Setup” from File Manager, then select, “Options” followed by “Change System Settings”.

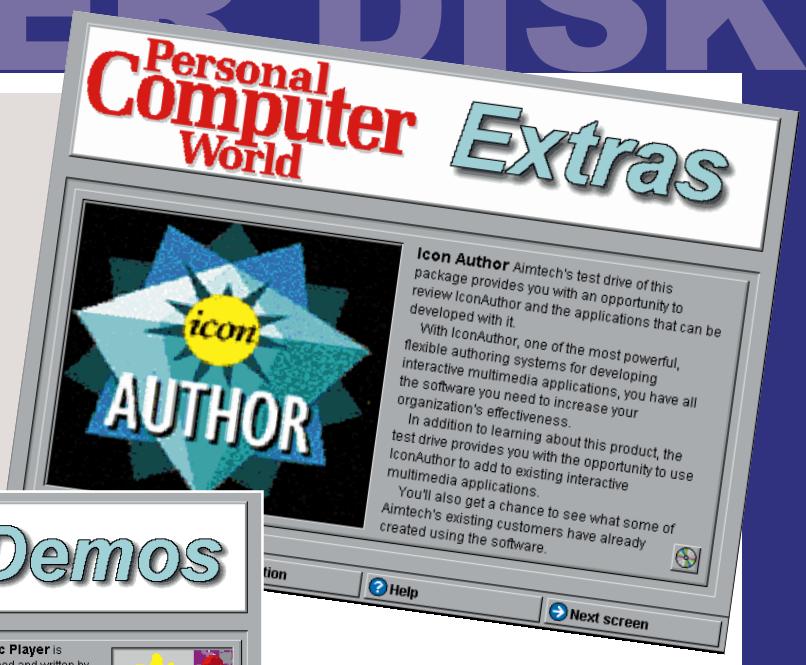
2) Scroll through the list of displayed graphic drivers until you get to the final entry “Other Display (Requires Disk from OEM)”, and select it.

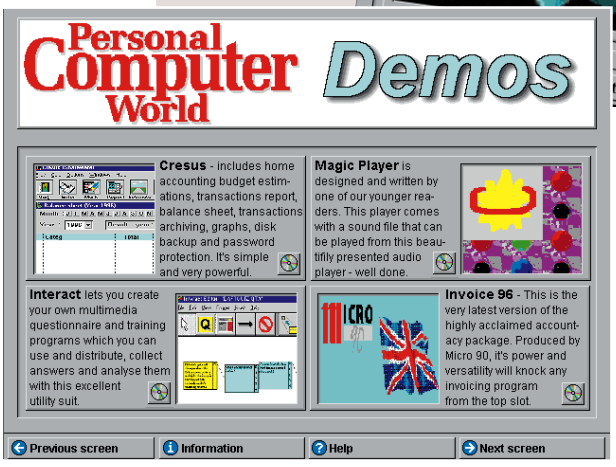
3) Insert this month's CD-ROM into the drive and replace the “A:\” prompt with “D:\SYSTEM\SVGA256” (changing the D: to the correct letter if your CD-ROM is not in drive D:), then press Return.

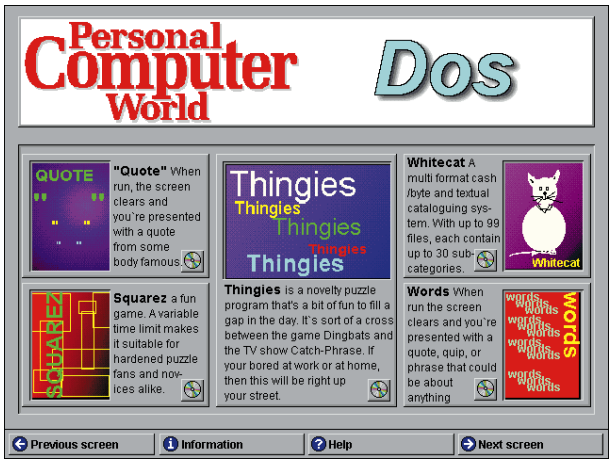
4) Scroll through the new drivers until you find the ones beginning “Super VGA....” and select the one for the resolution you prefer to use. The driver will then be installed and Windows restarted. PCWI and Video for Windows should then have no further problems.

If this works (which it should in 95 percent of cases), you may wish to contact the supplier of your graphic card to see if they have an updated graphic driver. If Microsoft's drivers don't work you will need to contact your graphic card supplier anyway.

Aimtech offers the chance to preview IconAuthor, a new authoring system. Indulge in our games for DOS, including Thingies, Squarez and Words, or learn what the famous say with Quote of the Day







set up its own buffers by adding a line such as /M:10 to the MSCDEX line, also in your AUTOEXEC.BAT file. Please refer to your manuals for full details.

● Windows NT and OS/2

Unfortunately Macromedia Director, the program used to create PCWI, is incompatible with earlier versions of Windows NT, but works just fine with the latest release. You should be able to run PCWI from OS/2 by simply calling up PCWI.EXE from the command line.

● If Video for Windows install fails

If the Video for Windows installation fails and you receive an error such as “XXXXXXXX.YYY cannot be updated as it is a shared file”, the answer is to delete the file “XXXXXXXX.YYY” (or whatever it is called) and reinstall Video for Windows.

● PCWI is slow to load, or runs slowly

You need at least 4Mb of RAM free to use PCWI. If necessary, you can obtain this by creating a permanent swap file of up to 4Mb. You are also advised to enable read cacheing of your CD-ROM by adding its name to the SMARTDRV line in your AUTOEXEC.BAT file. You should also allow MSCDEX to

SmartAddress is an effective address management system

PCW Advice & Contacts

The PCW CD-ROM is virus checked at every stage of production. However, *PCW* will not accept liability for any problems arising from its use. You are advised not to install software on a networked PC before checking the disc.

For technical support on the CD-ROM and the programs on it call the VNU 24-hour Hotline on 0891 616 444. This is a computerised touch-tone advice system, providing hints and tips on a wide range of topics. It also offers you the opportunity to speak to a member of our technical support staff during office hours by pressing the 0 key on your keypad. Calls cost 39p min off-peak and 49p at all other times (tone phones only).

Using the computerised system you can access the information you need very quickly. If you request to speak to a member of our technical support staff and we cannot answer your question immediately, we will offer to call you back at our expense. Outside office hours you can leave us a message by pressing the 9 key. If you leave your phone number we'll call you back at the earliest opportunity during office hours.

If you prefer, you can email rnixon@cix.compulink.co.uk, or on CompuServe 70007,5547.

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Editorial

remember eulogising about Adobe's Acrobat when it was first announced. Here was a technology that let magazine pages be viewed on-screen almost exactly as they appeared in print, and allowed them to be indexed and searched. Yet the file sizes were small.

Despite its potential, Acrobat failed to establish itself as the standard that Adobe hoped for. In the meantime, HTML, the hypertext mark-up language used on the Internet, swept all before it.

For a while I wondered why. We started a pilot project to put *Personal Computer World* back issues onto CD-ROM and I quickly found the answer. Acrobat is a large and confusing family of products, most of which cost hundreds of pounds that few, if any, people at Adobe Europe understand. To write our own front-end for Acrobat searches, we'd have to spend almost £1,000 on the software developer's kit and then pay a $5,000 fee to publish the information on CD.

The news that Adobe is to put most of the Acrobat product family into one Acrobat 3.0 bundle at £160 (see News, page 24) is long overdue and very welcome. We now hope to have *PCW* on CD-ROM by the autumn.

● We're lucky enough to have a direct leased-line connection to the Internet in the *PCW* office. This means almost instant Internet access with fast download times, Web servers permitting. As well as using it to access the WWW, it's a way to access online services directly like AOL, CIX and, until recently, CompuServe. Our direct connection to CompuServe recently came to an abrupt halt. Numerous calls to CompuServe's technical support people followed, most of whom didn't understand what a leased line was. Minutes into a conversation they'd say, "What modem did you say you were using?" Eventually, by calling the States, the problem was tracked down to Internet routing, which is the number of hops required to get to the CompuServe server. CompuServe insisted there was nothing it could do about it. There was only one thing for it: we dusted off that old modem.

Ben Tisdall
Editor

Next Month

Personal Computer World

Windows 95 — one year on

Has Windows 95 lived up to the hype? PCW charts its progress and looks back over the first year.

Group Test

Scanners

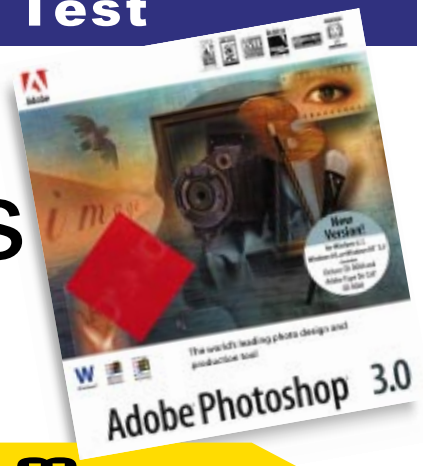
We review and rate the latest flatbed, handheld and document devices.

Multimedia Authoring Tools

Leading PC development systems head to head.

Group Test

Paint Packages



Speed Bump Macs

Apple's fastest PowerMacs on test.

September 96 issue
— On sale Thursday 1st August

October 96 issue
— On sale Thursday 5th September

** Next month's contents subject to change.*

Newsprint

NEWSPRINT NEWSPRINT NEWSPRINT NEWSPRINT

Upstart NC shapes up to take on the PC

Five major companies last month agreed specifications for the network computer (NC), which is seen by some as a serious challenger to the PC in homes and businesses.

Newsprint this month is dominated by announcements relating to the NC, which has gained considerable momemtum since the idea was touted last year by Oracle chief Larry Ellison.

Models based on the specifications *(see story below)* were being announced within days of the agreement between Apple, IBM, Netscape, Sun and Oracle.

Their so-called NC Reference Profile 1 is unusually short and simple for a technical document – you can download it in seconds from www.nc.ihost.com. It describes a cheap, easy-to-use Web-access box with a minimum 640 x 480 screen, a pointing device, provision for text input, and sound.

Storage is optional, as the NC (at least the business variety) will get all it needs from the network. No price is specified, but the target is $500.

Further reference profiles for different types of NCs will follow, but the initial spec is broad enough for both corporate and home devices. And it is platform independent: any chip or operating system can be used so long as the device understands Web protocols and can run programs written in JavaScript, the C-like language developed by Sun *(see page 23)*.

Few expect the NC to displace the PC, but recent developments may help it along a parallel evolutionary path. One is the emergence of fast non-Intel chips drawing very low power.

A second is the growing popularity of Intranets – company networks using Web browsers and protocols rather than traditional navigation tools for internal as well as external use *(see page 28)*.

And many companies are questioning the need for expensive hardware upgrades simply to keep up with the burgeoning needs of bulky and expensive software like the Microsoft Office Suite, fat with features that most people never use.

Peter Higgins, Microsoft's group VP of content and applications, dismissed the threat of the NC as requiring too much bandwidth. He added: "I seriously doubt if [NC maker] Acorn and the rest can produce a machine at the right price point."

Clive Akass

Microsoft maps road through Nashville

Microsoft evangelists hit London in force last month to announce a string of products evidently designed to swamp opposition. No less than three versions of the Internet Explorer broswer are pipelined:

- IE 3.0, available for download in beta, will ship in August.
- IE 4.0, codenamed Nashville and in effect a mini-upgrade to Win95, will see the browser merged for the first time into the desktop, so that surfing the Net will be like surfing your hard disk. It is due out late this year.
- IE 5.0, out early next year, will feature Web page editing as "natural and seamless as writing in Word," said Brad Silverburg, VP of Internet tools.

Microsoft also announced a technology called Normandy for service providers and Web sites.

Silverburg said Microsoft's Merchant trading pack would be largely dropped in favour of technology it has acquired through the purchase of E-Shop.

● *News Analysis, page 34.*

Newspaper of the *future*

No ... this is not a network computer, although it comes from NC maker Acorn and shows the kind of non-PC devices that may emerge as the Wintel grip loosens. Acorn calls the pilot device the NewsPad and it was developed as part of a European Union project to develop an electronic newspaper. The idea is to display broadcast news pages and video, and develop an editorial environment for the newspaper of the future. Details at art.acorn.co.uk.

NC three are released

Three NCs were launched within days of the spec being agreed. Acorn formed a company called NChannel, under its co-founder Herman Hauser, to market a £399 (inc. VAT) home Web-access box, called the NetStation, that will be available in October. It uses the ARM 7500FE chip from Acorn sibling Advanced Risc Machines, and uses a TV as a monitor. Primary control is via a remote control.

Marketing director Jamie Minotto said research showed home users were interested in Web access but knew little of email. "But they are likely to want email once they find out what it is."

IDEA uses the same chip for its ICS NC, which is part of an Intranet architecture integrating disparate platforms including SNA-linked IBM mainframes.

HDS claimed to have the first NC actually available. Based on the Intel i960 chip, its £650 WorkStation is rather more than a basic NC. It has 4Mb of RAM expandable to 128Mb, a Netscape-compatible browser, and runs HDS's own netOS which can run Java applets.

The NC runs Windows apps virtually. That is, it displays and controls them as they run on a server using NTrigue, a version of NT customised by Insignia Solutions, developer of SoftPC.

Acorn 01223 725005; IDEA 0181 390 5945 (or call distributor HAL on 01734 699699); HDS 01344 382164;

● *News Analysis, page 34.*

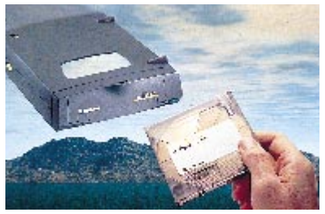
DVD confuses battle of the superfloppies

The first Digital Versatile Disc drives – the next-generation CDs – will ship very soon. Pioneer and Toshiba are believed close to launching and Hitachi was due to announce a product as we went to press.

Rewritable drives called DVD RAM could appear as early as next year, according to industry insiders, though licensing issues have yet to be settled.

Early prices will be on the high side but are likely to fall.

The first DVD ROM drives will read both 4.7Gb single-layer and 8.5Gb double-layer discs; the DVD format also allows for double-sided, double-layer disks holding 17Gb. Discs will at first be harder to get hold of than drives. DVD drives will read CDs, but initially only at the speed of a 3x CD.



The EZFlyer-230: backwards compatible

The prospect of DVD RAM will complicate the removable storage market. Iomega this month showed off the internal 100Mb Zip drive, which will be fitted with some Escom, Acer and Packard Bell models.

Iomega's European VP, Srini Nageshwar, said: "This will be the next floppy disk."

The same is being claimed by Compaq for its LS-120 drive, which takes 120Mb disks and can read standard floppies, though it is slower than the Zip.

Iomega's rival Syquest has given up that fight by presenting its 135Mb EZ-135 drive as targeted at a higher class of user: professionals needing a range of capacities for transfer and storage. It has just launched the EZ Flyer 230, which takes both 135Mb and 230Mb cartridges and costs £206 (ex VAT); 340Mb and 540Mb drives will follow.

Both Iomega and Syquest also offer 1Gb-plus removable drives, and profess that DVD RAM will be too slow to present a challenge. Nageshwar said prices of his 1Gb Jaz drives and cartridges will drop, and capacities will rise. "By the time DVD is established, who knows what the Jaz will be?"

Clive Akass

Palm Pilot flies to UK

We've just been given one of these to play with. It's a Palm Pilot and is selling like hot cakes in the US – you may recall Tim Bajarin enthusing about his. It uses Graffiti handwriting recognition and swaps data easily with a PC, reconciling data differences. Palm, now owned by US Robotics, is launching the Pilot here this month for £279, including VAT, software and the neat little docking station shown. Watch out for a review next month.

USR 01734 228200

Uplifting news

An online service selling bras and other underwear was launched last month at www.brasdirect.co.uk.

'So much for keeping abreast of technology.'

200MHz Pentium delayed

Intel has launched the 200MHz Pentium processor, but it may take some time to reach users. Intel said this is not unusual, and refused to comment on rumours of fabrication yields of as low as 10 percent.

Unlike the P150 and the P166, the P200 was launched before production really got going. Big PC makers have the chips, but distributors will not have them in volume to sell to smaller manufacturers until October.

Adele Dyer

...and is beaten by Cyrix

A PC based on the Cyrix 6x86 P200+ (also sold under the IBM badge) outperformed eight P200 boxes in our group test. Cyrix says the next version, codenamed M2, will support Intel's MMX extensions for fast multimedia processing.

● *See page 82.*

Short Stories

Kodak launches cheap digicam

● The DC-20 is Kodak's first digital camera at a High Street price. It offers full-colour 493 x 373 resolution and stores up to 16 pictures. Sensitivity is a very fast 800ASA. UK list price is £349 – £50 less than the Casio QV-10, which offers 320 x 240 resolution and an LCD viewing panel. The US price is only $350, so expect discounts.

• *New fast format – page 26.*

Net backbone

● Internet capacity will be boosted by 30 percent by a global backbone being built by BT and US partner MCI.

● Matrox's Mystique card, based on the new MGA-1064G processor, offers 3D, 2D and video acceleration for Windows and DOS. RRP £153.

Matrox 01793 441144

● Compaq used Visioneer's PaperPort engine on its integrated keyboard/scanner (Gadgets, page 54). Visioneer has followed suit with this model, costing about £350.

Computers Unlimited 0181 200 8282

Scope of Web

● Scope (ex Spastics Society) has set up on the Web at scope.org.uk to help isolated disabled people keep in touch.

Corel's Java port will put WordPerfect on the NC

Corel has jumped on the network computer bandwagon with a Java version of its office suite. The move, announced at the launch of the 32-bit Windows 95 version of Corel's WordPerfect 7.0 suite, is important because of the product's unique position.

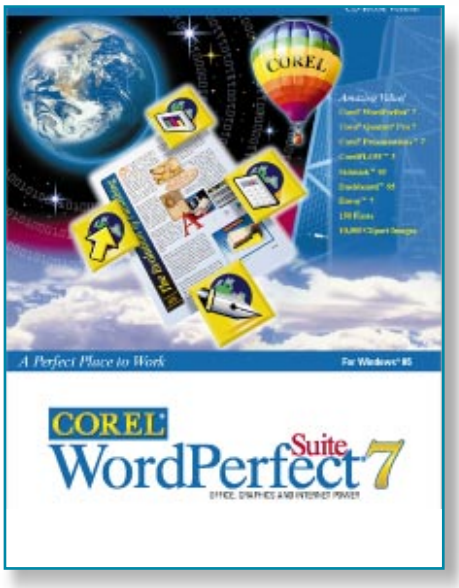
WordPerfect was once a world bestseller. Word now outsells it by far, primarily as part of the Microsoft Office suite. But WordPerfect has a huge number of users, many still with old versions going back to DOS days.

A high proportion would need to upgrade their machines to run the latest versions. But Java would allow users on a network to download modules as needed, rather than stoking up a top-heavy program from disk, and they could use either an existing low-spec PC or a low-cost NC.

The NC/Java model, if succesful, could help Corel hang on to its users and reverse the drift to Word as they upgrade. This would turn Corel's $200 million purchase of WordPerfect from second-owner Novell earlier this year into a bargain.

It is also a boost for the NC, as it provides a world-class applications suite in component form – though how much of the suite will go to Java is unclear.

The first Java code will be available within three months, Corel's UK-born chief Michael Cowpland said at the London launch of the WordPerfect 7.0 suite.



The 16-bit version 6.1, targeted at Window 3.1 users and reviewed on page 62, has just begun to ship and the Win95 version will be available by the time you read this.

Voice recognition, a feature that had been predicted, is not included, though IBM VoiceType navigation is bundled. Features include on-the-fly spell checking, automatic fit-to-page, and multi-level undo.

Also included in the bundle is a revamped Quattro Pro 7.0 spreadsheet, the Envoy publishing tool, CorelFlow and the SideKick organiser, plus application launcher, 150 fonts, and 10,000 clip-art images.

List price is £199 for the CD version, £228 for disk and CD, and £119 for upgrades.

Clive Akass

Microsoft handheld and homespecs cling to Windows

Microsoft has been dismissive of the network computer, but BIll Gates has come up with two rival hardware designs. One is the Simply Interactive PC (SIPC), which is designed like a home appliance.

It's a sealed box from which peripherals can be daisychained using Intel's new USB bus, or the faster Firewire. It will run games, play DVD disks, and access the Web, including email..

It will go into standby rather than switch off, enabling it to listen for email or fax calls, or turn on a cooker. This will also make for an Instant On feature.

And of course it will run Microsoft software. Intel, H-P, Toshiba and Compaq are said to be working on models based on the SIPC.

And details are emerging of a handheld computer on which Microsoft is testing a Win95 interface called Pegasus, *writes Tim Bajarin.*

Sources say the device is a little larger than the HP 200 LX series, with a better screen and keyboard.

Microsoft is positioning it as a mobile that lets people take selected data away from the desktop PC easily. Like the Palm's Pilot *(see page 21)*, it facilitates the swapping and synchronisation of desktop and handheld data.

The device uses either the Hitachi SH-3 or Mips 4000 rather than an Intel chip. There are no details of which vendors will make it.

I am impressed that Microsoft has found a way to put the Windows GUI on a small device. This will be the most important part of the strategy and could finally kick-start the mobile market.

You can see Gates's thinking behind the idea: using a single GUI on all types of digital devices has great appeal to consumers because the learning curve would come only once.

If Gates pulls Pegasus off, you can bet he will extend the Win95 interface to all types of digital appliances.

Tim Bajarin reports from the U.S.

To say the recent Java Developers Conference was successful would be an understatement. Over 5500 people went along to gain a better understanding of Java. Java is so hot that there are already 20 books about it on the market, and another 70 on their way.

Why is Java so hot? Sun's Lew Tucker jokingly described it as "totally buzzword compliant."

Some other announcements that came out of the conference:

- Mitsubishi is developing a low-cost Java processor for handheld devices, such as navigational aids, and cable TV set-top boxes.
- National Semiconductor plans to embed the Java OS into chips used in phones and net-access devices.

● Last week Intel announced a VideoPhone for embedding in a PC and costing only about $200. It uses the H.324 standard for using standard phone lines, over which they can get about 10 frames per second. This frame rate is bound to increase as compression improves.

Many believe that videophones could help prop up the teetering home computer market. Market research shows two segments are very interested: baby boomer couples living far from their parents; and teenagers who want to see their friends on the phone.

● Panasonic was in town last month showing of its new multimedia notebook with a PD optical rewritable drive in it. The top of the line has a Pentium 133MHz chip, 16Mb of DRAM, a 1.3Gb hard drive and a 12.1in colour TFT screen with 1024 X 768 XGA resolution. It costs $7199 with ihe PD drive, which doubles as a quad-speed CD drive.

Panasonic can lay claim to having the first rewritable CD in a notebook. It can handle 500,000 rewrites at a cost of about six cents per megabyte. It is scheduled to ship around the first of July.

Compaq joins the slimline set

Compaq has launched three new notebook ranges including a slimline, like recent Dell and IBM models.

The updated LTE 5000 caters as a portable desktop replacement. The Armada 1100 is the budget range, with prices starting at less than £1,500. The Armada 4100 (*pictured*) is a slim 5lb notebook for mobile users. The battery doubles as a handle and rest, and there is an optional slim, light, multimedia unit.

NEC, too, unveiled its latest Versas: the 6000 range. The Versa 6030X has a 133MHz processor, 16Mb of RAM, 1.44Gb hard disk, 256Kb L2 cache and a 12.1in XGA TFT screen. Multimedia capabilities include a six-speed CD-ROM module and C&T Hi-QVision Multimedia PCI video sub-system, which provides hardware acceleration for MPEG-1, Cinepak and Indeo formats. It also comes complete with two 4Mbit/sec infra-red ports.

Toshiba has revamped its Satellite models with 11.3in colour screen and a 100MHz option. In the higher-end Tecras, a new 500CS has a 120MHz processor and space for a second hard disk. The Satellite Pro uses the new Zoomed Video technology for fast video playback. The 500DT boasts a 12.1in TFT screen offering full colour at 800 x 600 resolution.

Short Stories

H-P launches friendly family PC

● Hewlett-Packard has launched the Pavilion, which it claims is the world's friendliest PC. Features include a built- in colour scanner, designed for inputting family snapshots, and a photo-editing package which allows you to correct "red-eye".

Bundled software will include a children's encyclopedia, games, photo-editing, home finance and Web-page creation modules. Options include 100MHz, 133MHz or 166MHz Pentiums and quad- or six-speed CD drives. Prices range from £1,549 to £2,999 (plus VAT).

Hewlett-Packard 01344 369222

Disaster aid

● Ontrack Data Recovery has published a book on how to recover data from crashed drives, tapes, and other storage systems. You can download it from www.ontrack.com

Drive my card

● These Digicorps PC Card drives come in 130Mb, 170Mb and 260Mb capacities costing respectively £291, £331 and £418 (plus VAT).

Digicorps 01372 844151

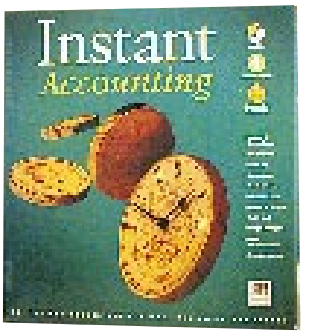
Home PC bank links getting closer

Natwest has become the fourth high-street bank to announce an online banking trial for PC users. It will involve 1,500 homes and 500 small businesses, using Netscape and Java software.

Users can look at their bank balance, transfer money between accounts, pay bills, access banking information and buy and sell shares. All information will be encrypted. TSB, Midland and Barclays have launched similar pilots.

Online banking will eventually link in to personal accounts packages like Microsoft Money and Intuit's Quicken range. This hook into the world finance system was why Microsoft tried, in May last year, to take over Intuit for $1.5bn in what would have been the biggest-ever IT deal. It was abandoned as a result of anti-trust pressure from the US Justice Department.

Big businesses have long had direct links to their banks. UK accounts specialist, Sage, recently launched a business online banking service with the Midland. Last month it launched version 3.0 of its Instant Accounting package, targeted at small businesses computerising their accounts for the first time.



Sage: bank link-up on the way

Marketing manager, David Pinches, said: "Within the next couple of releases, we expect to have incorporated a button into the package which will allow the user not only to access bank information such as outstanding payments, but to make transactions accordingly."

The package costs £127.50 (plus VAT), or £49 for upgrades.

Jessica Hodgson

Sage 0191 255 3000

Adobe somersaults on Acrobat prices

Adobe has at last pitched its Acrobat suite for the mass market, bundling all the modules for £160: a fraction of the price they would have cost a year ago.

Acrobat's portable document format (PDF), derived from PostScript, allows true WYSIWOG — what you see on your screen is what others will get on theirs when you send it to them, whatever their machine.

It has gained importance with the growth of the Internet because it can guarantee the look of Web pages on any machine. PDF is an open format and supports hypermedia links, and is therefore a potential rival to HTML.

Adobe's pricing policy has been much criticised, by *Personal Computer World* and others. It even charged for the first Acrobat Reader, apparently expecting people to pay for the honour of reading its customers' correspondence.

The reader, like others of its kind, was quickly put into the public domain yet the prices of other Acrobat modules remained high: Capture, which translates scanned documents into PDF, cost £1,636 although this price was slashed recently; Acrobat Pro cost £460; Exchange cost £150; and Catalog, £385.

All this functionality will now come with the £160 Acrobat 3.0 bundle, due to ship in November. Beta copies can be downloaded from www.adobe.com.

● *See page 95*

Short Stories

Visio shapes up for niche uses

● Visio is to market a series of specialist add-ons for users of its drawing package. Some will be available for download from www.visio.com and others will come on CD. It also plans a series of partnerships with companies working in areas for which Visio's "smart shapes"can be customised. Visio Business Modeler, a $349 add-on for Visio 4.0 or Vision Technical 4.1, is the result of a partnership with the German software giant, SAP. It is designed to visualise implementations of SAP's R3 system and facilitate business process re-engineering.

Visio 01372 227900

Paper offer

● PaperDirect is bundling a stationery starter pack with letterheads, brochures, postcards and envelopes, plus a series of suitable templates with upgrades to Microsoft Word for Windows 95.

The software is set up to enable you to easily produce professional-looking documents. The uppgrade bundle, for any competing word processor, costs from £99.95, or £129 (both excl. VAT).

PaperDirect 0800 616244

Elonex goes soft on remote access

● Elonex has launched into the software business with what it claims as "the lowest-cost remote access solution available today".

HTMail costs £19.50 per user and provides access to your existing email via the Internet. Existing packages allow access through the office LAN.

Elonex 0181 452 4444

PC insurance

● Lloyds broker, Burke Ford, is offering insurance up to £20,000 for PC users who work from home. Most home insurance companies cover contents up to £10,000 but are unwilling to provide insurance on higher amounts.

Burke Ford 0171 712 0140

New format promises imaging for the masses

A new digital processing architecture will bring advanced imaging to the desktop PC, Kodak believes. FlashPix is the result of a collaboration between Kodak, Hewlett-Packard, Live Picture and Microsoft.

At its heart is a new FlashPix format which stores a hierarchy of copies of the same picture at different resolutions. The copies add only 30 percent to the file size; an overhead which can be reduced further by using standard JPEG compression, says Kodak imaging software product manager, Hal McLenon.

The beauty is that you can use the most suitable resolution for the task in hand but have instant access to the highest resolution. Transformations and editing can be done at low resolutions on a comparatively low-spec machine, and then applied to the higher resolution.

You can zoom in to a FlashPix image and get increasing detail up to the highest resolution. Edits such as crops, morphing, even collages of different pictures can be stored or transmitted as instructions, leaving the original untouched.

Optimised applications can then recreate the edit by operating on the original image, without needing to store an edited file. This represents a considerable saving in storage. It also facilitates experimentation as multiple edits can be tried and stored without damaging the original, or clogging up a disk.

FlaskPix files are designed to be transportable image objects suitable for use in every stage of an imaging process, from digital cameras or scanners, through applications to printing services.

Kodak Digital Science 01442 844365

Fowl play with GPS

What is the connection between a golf ball, a carborne laptop and a falconer (perversely pictured here with a splendid tufted owl)? The answer is Global Positioning System (GPS).The falconer in question is Gary Morris, who runs a falconry display business called High Flyers and uses GPS to track his birds when they fly off. Each has a tiny radio locator from which he takes two bearings.

A shareware program, called GPSS, is used to calculate and display the bird's position (*inset*). GPSS, which is on *PCW*'s free cover disk this month, was written by former NATO engineer, Robin Lovelock, who claims it is the best in the world. He makes his money by customising it for tasks like vehicle tracking. Meanwhile, Trimble is developing a GPS system to advice golfers on how to play a shot. It does not, however, find lost balls.

Trimble 01442 61199; Lovelock 01344 20775;
High Flyers 01758 613386

Mopy dicks squabble

It's a dilemma familiar to most office staff: do you print out 20 copies or walk to the photocopier? A recent Hewlett-Packard advertising campaign tried to turn the question into a science, and infuriated rivals.

The campaign pushed the virtues of "MOPying" (Multiple Original Printouts) using every PR trick in the book, and a catchy little slogan "Forget the Copy. It's Time to MOPy", claimed that the idea would change lives. To back its claim, H-P reckoned that photocopying wastes an average 315 minutes per employee a month at a cost of $20 per hour. This is misleading, said Kyocera's Ian Joslin. And Richard Bush, Erskine's UK marketing manager, said: "Most of us have to walk to our network printers to collect prints."

Jessica Hodgson

Kyocera 01734 311500; Erskine 0171 253 4545

Speech gets personal

The only commercial system to recognise continuous speech, will be implemented on a single PC when processors become powerful enough.

The Philips Dictation System (PDS) currently runs only on a network and is designed for heavy-duty dictation pools, as found in lawyers' offices and in hospital radiation departments where reports on X-rays are dictated and transcribed for doctors to read.

Dictation, transcription and correction are entirely separate processes. "We will be able to do it in real-time on a single PC with a powerful processor," said PDS's David Kitchener.

The company has launched SpeechFlow, a workflow product for dictation that can incorporate its speech recognition system.

Philips Dictation 01206 755600

Short Stories

Murdoch starts data service

● Rupert Murdoch's News International has launched an online information service in competition with Reuters and Maid. Features include a friendly interface and fast smart searches.

News EyeQ draws on about 6,000 sources of information including national and regional papers, trade magazines, company financial data, market research and share prices.

There are two payment scales: £20 a month plus £2 per full text article; or £50 plus 75p an article. Access is by direct connection, initially, although the service may move to the Web.

News EyeQ 0171 782 3850

On the map

● Geosoft has released MapServer 3/32, a £795 (excl VAT) library of reusable components for geographical information, digital mapping and facilities management systems.

Bits Per Second 01273 727119

Telephony kit for developers

● Artisoft's new Visual Voice Pro 3.0 turns any OLE-supporting development environment (including Delphi, Visual Basic or C++ 4.0, and PowerBuilder 5.0) into a telephony application toolkit. The NT version, which can support up to 72 simultaneous calls, costs £795 and the Win95 version is £495 (both excl. VAT).

Artisoft 01753 842200

Family pack

● Family Origins 4.0, which helps you keep track of any number of relations and ancestors, is on sale for £25.49 (plus VAT).

Guildsoft 01752 895100

Local browsers prepare paths for the fabled NC

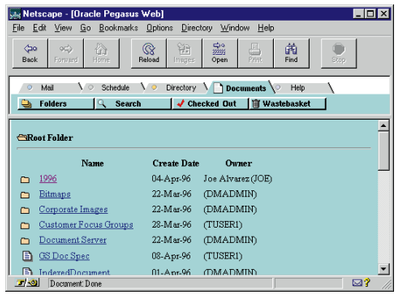
The network computer *(see page 20)* is only part of database giant Oracle's broadside on the desktop duopoly of Microsoft and chipmaker Intel.

The company has launched a technology called InterOffice which it describes as "second generation groupware" designed to compete with "first generation products" like Notes *(see below)* and Microsoft Exchange.

This fits the architecture of the NC, which uses Web browsers and protocols to access information and applets from either company networks (intranets) or the Internet.

Oracle is by no means the only company to produce intranet groupware, but it claims to be the first with a complete product built for the Web from the bottom up. It argues that market leader, Notes, is not scalable to very large systems. InterOffice is designed to mediate between the intranet, which may include multiple platforms, including NCs and PCs, and corporate databases.

Initially, it will work only with the Oracle 7 relational database management system, but



eventually rival products answering to structured query language (SQL) will be supported. This means complex databases can be accessed using a simple browser interface. Directory structures *(above)* and other information will be converted, on the fly, into HTML for easy access.

InterOffice will ship at the end of July "at a price comparable to individual products".

Oracle 01344 860066

Domino opens Notes to the Web

Notes servers can double as Web sites using a product codenamed Domino, demonstrated last month by Lotus. Notes users access the server as usual, but to a browser like Netscape Navigator it looks like a standard Web site.

Lotus has already released Web Publisher, which translates Notes files into the Web's HTML. Domino differs in that it does the translations on the fly, leaving the originals untouched and amenable to Notes' management and security features.

Notes links, which Domino translates into HTML pointers, disappear when their target is deleted; by contrast, every Net user is familiar with hotlinks that have gone cold.

A recent Input report predicted that the dominance of Notes would peak in two years, when it will lose out to rivals built from scratch for Web use.

Users at a Notes conference last month dismissed the threat.

High-capacity memory cards are getting cheaper, if not cheap. Mitsubishi cut the price of this 4Mb SRAM card by 30 percent to £500 (plus VAT).

Mitsubishi 01707 276100

They pointed out that although browsers and their add-ons can do most things that Notes can do, the functions are not nearly so well integrated or secure.

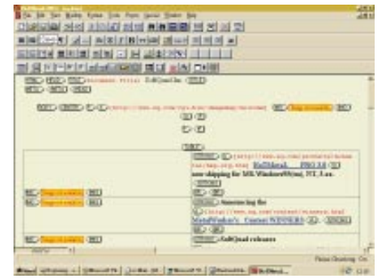
Victor Aberdeen, internet product manager at Lotus, said: "Netscape might allow you to collect information on a form, but then what do you do with the information? You might have to write a special routine to cope with it. Notes does it all for you."

Michael Chapman Pincher, chairman of the Lotus Notes User Group, said: "The Internet could have been a problem. But John Landry [who liaises between Lotus and new owner IBM] saw it coming and did something about it."

Clive Akass

Beta versions of Domino are available at domino.lotus.com. Lotus 01784 455445

HoTMetal 3.0 goes WYSIWYG



Softquad has launched version 3.0 of its veteran Web authoring tool, HoTMetal Pro, featuring a WYSIWYG interface and drag-and-drop editing. A button bar links with up to four browsers to check for display variations.

The package also helps you keep up with new HTML extensions, allowing you to see which are supported by what browser. Updates can be downloaded from Softquad at www.sq.com.

The edit window is similar to old versions of WordPerfect in the way it lets you toggle the display of formatting codes.

HoTMetal Pro 3.0 is available now for £99 (plus VAT). Demon subscribers can get a light version free, either by download or bundled with the company's Turnpike suite.

Softquad also launched Panorama Pro, which it claims is the first browser to read SGML (standardised general markup language), the "big brother" of the Web's HTML.

Softquad 0181 236 1001;
Demon 0181 371 1234

Web providers split over threat of anti-porn law

A decision by Pipex to censor newsgroups featuring child pornography has highlighted a rift among Britain's internet service providers.

The move follows the drawing up of a code of practice by the newly-formed Internet Service Providers Association (ISPA) to stave off threatened government legislation along the lines of the controversial US Communications Decency Act.

But Demon Internet, the UK's biggest dial-up provider, refuses to censor groups and is not an ISPA member. Marketing manager, James Gardiner, said Demon was never asked to join and he dismissed the ISPA as self-appointed and unrepresentative.

"There are around 160 internet service providers in the UK. At last count, ISPA had 49 members," he said.

Pipex, an ISPA member, said it was acting on Scotland Yard advice in blocking groups featuring material of a kind "illegal in most countries". Press officer, Henry Ritson, said: "There's a continuum from white through to black, with several shades of grey in between. We're not talking about the grey areas."

But Gardiner said it was unrealistic to check all material for offensive content. "You can't read 500 million words in a day. The ISPA is promising something that's technically impossible to provide."

A spokeswoman for Scotland Yard's Computer Crimes Unit agreed that the Internet is "virtually impossible to police."

The Pipex move followed a speech by Technology Minister, Ian Taylor, at Internet World in which he said that if providers did not move quickly to control material, the government would be forced to bring in legislation.

The ISPA's code of practice, posted at www.ispa.org.uk, is voluntary for members for the next 12 months; if successful, it will then become mandatory.

It says members should take reasonable measures to maintain decency, fair trading and data protection. Indecency is defined as being capable of inciting violence, sadism, cruelty or racial hatred.

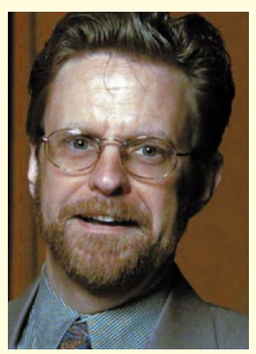
ISPA chairman, Shez Hamill, said: "Had we not taken action on the code of practice, we would have seen police action within a month or so."

US judges last month ruled that the Communications Decency Act was unconstitutional.

Jessica Hodgson

Pipex head quits after merger

UK net pioneer, Peter Dawes, quit as head of Unipalm Pipex as it relaunched last month as Uunet Pipex. The name reflects its merger with US provider Uunet Technologies, which is headed by John Sidgemore (*pictured*).



Uunet also merged with MFS, which owns a huge fibre network, to become one of the world's largest Web combines.

Dawes was elected a committee member of the Internet Service Providers Association, at the inaugural meeting at Internet World.

Short Stories

Procomm gets on the Web

● Quarterdeck demonstrated the latest version of Procomm Plus, which now integrates internet, fax and standard datacoms functions.

Procomm set the pattern for the likes of Netscape back in the eighties when it built a big user base as shareware before going fully commercial. Quarterdeck acquired the package when it bought developer, Datastorm.

Procomm Plus 3.0 includes a browser called Web Zeppelin, an enhanced version of Spyglass's Mosaic, which allows you to fax or email Web pages to friends who are not netted.

It can also be used with CAPI 1.1 or 2.0 ISDN adaptors and costs £109.95.

Quarterdeck 01245 496699

Row over CIX "slander" ban

● Service provider, CIX, cancelled the account of a subscriber and threatened to charge him £10,000 over comments he made in an public online conference, he claims. Darren Ingram, editor of *Telecomworldwire* and *Internet Business News*, said he was accused of slander and "blatant abuse" in an email from CIX director, Sylvia Thornley, after he commented: "CIX will still read the closed conf[erence] if they wish." CIX declined to comment.

Miro boards

● Miro's MiroMEDIA range offers television, hardware MPEG playback, internet access, teletext, audio and video CD playback, combined in two boards. All multimedia functions are launched from one software interface.

Contact Miro 01494 510250

CompuServe deal

● Microsoft has agreed to bundle a CompuServe sign-on button with Windows 95, just weeks after doing a similar deal with AOL. The two services will appear on the desktop in competition to Microsoft's own MSN.

Short Stories

Cracker claims to pick winners

● Tired of backing turkeys on the Grand National? Your problems could be over with a package called Raceform Cracker (£14.99 incl. VAT).

It lets you maintain a database of up to 1,000 races, with details of runners, riders and trainers, track, distance, and performance statistics. Raceform Cracker uses artificial intelligence to make a selection.

CCA Software 0161 480 9811

Branching out

● Shiva is targeting its £795 AccessPort at branch offices and telecommuters. It links to a PC or local net via an Ethernet port, and has one two-channel ISDN and two analogue ports for standard phones and fax machines.

The ISDN channels can be used together or separately, and software *(shown above)* automatically adjusts line use to minimise charges.

Shiva 01734 774747

CD phrasebooks

● VCI has launched a range of £20 CD-based talking phrasebooks. Linguamatch titles are available in French, German, Spanish, Italian and Russian, and feature over 2,400 words or phrases.

VCI 01923 255558

Go to Blaise's

● The British Library has put a database of information on its 17 million publications onto the Web. Its catalogues and bibliographies are available on the Blaise Web site.

http://blaiseweb.bl.uk

V34-plus modem

● MultiTech Systems' ITU Study Group 14 Modem range will now support a top speed of 33.6Kb/sec, which is expected to be ratified as the V.34-plus standard.

MultiTech 01344 891266

Software houses cash in on joke of the century

Software companies are slavering over the bones of the GMC (Great Millenium Cockup), which could turn out to be the most lucrative bug in history. They are eager for a slice of the estimated $600bn that will be paid out, worldwide, to solve the problem of IT systems that can't cope with the switch to the year 2000 because their dates are stored as two figures.

Typically, such systems will lose a century as they switch up from 99, when they interpret 00 as 1900. Worst hit are systems built during the seventies and eighties, when storage and memory were tight enough to make the saving of (at most) a byte per date worthwhile.

Usoft and ICL have set up millenium teams, knowing that many companies will take the opportunity to modernise their systems. Usoft European services director, Frank Verschoor, said: "The majority of problems exist within Cobol mainframe programs which are in serious need of replacement anyway."

Software AG has launched a consultancy called Expedition 2000 with a range of tools to tackle the problem. Its focus is on large systems, but it plans a range of tools to address the problem at desktop level.

Marketing director, Ken Jacobson, warned: "People think that only mainframes are affected but the problem goes right down to the PC. And don't forget that PCs are often talking to mainframes, and a fault in the PC software may affect the mainframe, or vice versa."

Solutions can involve major re-engineering, with every line of code having to be examined for date sensitivity. But as many systems have been patched and re-patched, almost beyond comprehension, can anyone be certain that the problem is fixed?

Will salaries suddenly stop, and standing orders sit down at the turn of the millenium? Will the dead (virtually speaking) walk? Will pensions be sent to graves? Are we due, literally, for the joke of the century: the accidental collapse of the world finance system? Jacobson claims to be unworried at the prospect. "We won't be the ones with our fingers crossed," he said.

ICL 01344 472000; Usoft 0181 332 2251; Software AG 01727 844455; Chase 0171 731 4455

Jacobson: "PCs will be hit"

Reasons to be cheerful

Mention the millenium and someone is bound to drag in Nostradamus. Chase Software, trying to drum up some 2000AD-bug business, came up with this cheerful quote from the seer: "From the sky will come a great king of terror… There will be war, there will be peace, but everything one day will cease." Over the top? You won't think so when your company slides under as IT systems fail and "operations grind to a halt," predicts Chase's Paul Weller. So what did Nostradamus say about millennial hype?

PC link to Meridian systems

The growing integration of PCs and telephony is passing many offices by because they are too modern. They use digital lines that will take neither ISDN nor standard analogue phones, so telephony-enabled Windows software will not work with them, says Gavin Warnes, business development manager of Calista. PowerDial 200 links a PC to Meridian 1 and Meridian Norstar systems sold by BT and will work with most PC diallers. It is designed to work with organisers and contact managers like SideKick, Act and Telemagic.

Calista 01753 891670; www.calista.com

UK firm launches telephony pack

UK comms specialist, Trans-Send, has released a £99 telephony package called Personal Assistant (PA) for home and small-office users.

The software distinguishes between voice, data and fax calls and deals with them appropriately. Features include individual fax and mail boxes, fax-back, message and fax forwarding, voice mail, file transfer and call routing.

Marketing director, David Favre, said PA was likely to be sold with modem packages.

Trans-Send 0181 207 5165

Amelio's Apple stakes the orchard on the Internet

Apple has followed Microsoft's lead in staking its future on the Internet.

All new Apple products will be net-enabled as standard, and Macs will have at least 12Mb of RAM to help create and download multimedia files, chairman Gilbert Amelio told the company's annual developer's conference.

A new internet connection kit includes Netscape's browser, with a Cyberdog-based plug-in version of Adobe's Acrobat reader (Cyberdog 1.0, a suite of net applets using OpenDoc components, can be downloaded from www.cyberdog.apple.com). Other moves include:

- TCP/IP support for the Newton, enabling net access. Beta versions of a net toolkit are already available.
- Java support in the Mac operating system.
- A plug-in version of Apple's PlainTalk speech recognition for the Netscape browser.
- A Cyberdog-based version of Macromedia's Shockwave multimedia technology.

In another major move, Apple joined the group which set out the specifications for a new network computer *(see page 20)*.

Amelio has the task of turning Apple around after the ousting of his predecessor, Michael Spindler.

Several high-flyers quit when Amelio announced an organisational shake-up at the end of May. They included Steve Capps, the man credited with designing the Mac interface, who was quoted as saying he was "burned out".

Apple UK 0181 569 1199

Sony shows its true colours

Sony says this GDM-2000TC monitor is the most colour-accurate available. It is designed as a colour reference display for pre-press work on major platforms and is compatible with Apple's ColorSync.

Sony 01932 816000

Top 10 Peripherals

	Product	Manufacturer	Last month
1	Epson Stylus Colour	Epson	2
2	US Robotics Sportster 28.8Vi	US Robotics	-
3	Quad-speed CD-ROM Drive	Goldstar	1
4	Epson Stylus Colour IIs Printer	Epsom	4
5	Quad Speed CD-ROM Drive	Elite	-
6	SoundBlaster 16-Valve IDE	Creative Labs	5
7	Six Speed CD-ROM Drive	Aztech	-
8	Umax Vista S6E Scanner	Umax	-
9	Motorola Online Internet	Motorola	3
10	Iomega Parallel Port Zip Drive	Iomega	-

Top 10 DOS

	Product	Manufacturer	Last month
1	Flight Simulator v5.1	Microsoft	1
2	MS DOS v6.22 U/G	Microsoft	4
3	Duke Nuk'em 3D	Apogee	-
4	WordStar v6	Softkey	3
5	Windows for Workgroups 3.11	Microsoft	6
6	Turbo C++v3	Borland	7
7	Worms	Ocean	-
8	Fifa Soccer '96	Electronic Arts	8
9	DOS to Windows 95 U/G	Microsoft	-
10	PCDOS 7	IBM	-

Top 20 Windows

	Product	Manufacturer	Last month
1	Windows to Windows 95 U/G	Microsoft	4
2	Microsoft Encarta	Microsoft	1
3	Jungle Book	IBM	-
4	TurboCAD 2D/3D	IMSI	3
5	Uninstaller 3.5 (32-bit)	RMG	16
6	Microsoft Office Pro 95 U/G	Microsoft	10
7	Hurricane Ram Doubler	RMG	-
8	Microsoft Office v4.2 U/G CCP	Microsoft	4
9	First Aid for Windows 95	RMG	5
10	Corel WordPerfect Suite U/G	Corel	-
11	MS AutoRoute Express UK & Eire	Microsoft	8
12	Dr Solomons Anti Virus Qrtly '95	S&S Intl	12
13	Cleansweep 95	Quarterdeck	6
14	MasterClips Premier 35,000	IMSI	7
15	TaxCalc	IDP	-
16	MS Plus for Windows 95	Microsoft	11
17	QEMM 8	Quarterdeck	13
18	Dr Solomons Anti-Virus Qrtly	S&S Intl	19
19	D-Time for Windows 95	RMG	-
20	Pass your GCSE Maths	Mathsoft	14

Figures supplied by Software Warehouse and relate to bestsellers for June 1996.

Short Stories

Roast Java for the Mac

● Natural Intelligence is shipping a new pre-release version of Roaster, which it claims is the first Mac-based Java development environment. New features of the so-called Developer's Release 2 include support for 68000 chips as well as PowerMacs, an integrated browser and class tree and AppleScript support. A Roaster subscription, which includes DR2, plus all associated updates, costs $299.

www.devdepot.com; orders@devdepot.com

Cocoa puts web pages to bed

● A multimedia authoring tool called Cocoa, aimed at children and non-technical adults, was demonstrated at Apple's annual developer conference. A free Netscape plug-in allows simulations and games to be quickly put into Web pages. Pricing for the main product is not yet known but it is expected to ship later this year.

Livewire

● Gonet has launched a Mac package, called Golive, for easy Web publishing. It costs $49.

www.golive.com.

Delrina gets on top form

● Delrina, now owned by Symantec, has launched FormFlow 2.0, which adds full integration with Microsoft Exchange and allows forms to be accessed from internet FTP sites, file servers and databases. FormFlow 2.0 also includes FormBasic, an object-orientated programming language for developers. It will support OLE 2.0. The FormFlow 2.0 starter kit will cost £299.

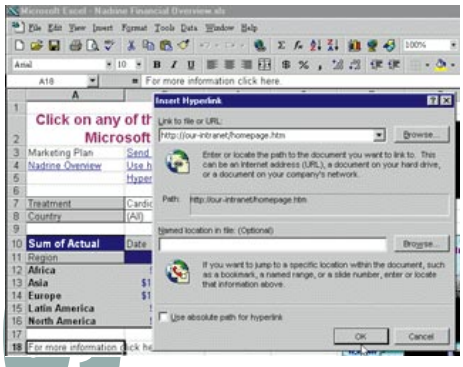
Delrina 01628 592320

Newsprint welcomes feedback. Send your news and views to clive_akass@pcw.ccmail.compuserve.com or fax 0171 316 9313

Together, they stand

Clive Akass states the case for the NC (*page 20*) as a force for change when combined with Java portable programs.

Microsoft's forthcoming Office 97 will integrate Web facilities, but is the ground shifting to platform independence?



MY FIRST REACTION TO the Network Computer (NC), when Oracle chief Larry Ellison propounded the idea last year, was to ask what all the fuss was about. NCs have been around longer than the PC. They were called dumb terminals. They were boring, so everyone turned to the PC.

Then there was the matter of plumbing. Who'd want to pull applications, even Java applets, off the Internet via a 28.8Kb/sec modem? It would be like using a straw to fill a bath.

It seemed to me that Oracle and allies like Java-developer, Sun, wanted to shift computing from the Microsoft-Intel axis and had transformed wishful-thinking into hype. But the NC ripples have coalesced into a wave. As Tim Bajarin reports [on page 23], there were more people at the Java developers' conference than at the one for Microsoft developers.

And Notes, once undisputed leader in providing ways for groups to share information, is on the defensive (*see page 28*) as internal company networks are transformed into browser-navigated intranets operating just like the Web.

On intranets, the NC has a lot going for it. Applications sitting on servers are much easier to update and maintain. Running and equipment costs are less and the plumbing is up to the task. So, whatever happens in the home market, sales in the corporate market could give the NC a kick-start.

Microsoft seems to have lost some of its cockiness despite a bewildering series of announcements designed and, in many respects destined, to extend its domination in both the intranet and Internet markets. There is a sense of the ground shifting.

The fact that Microsoft announced support for Java in Internet Explorer was hailed as a great victory in the NC/Java camp, but it merely maintained parity with Netscape. The real test will be what happens to Microsoft's rival, ActiveX, a revamped OLE technology which can also provide Java-like applets.

ActiveX looks like Microsoft's attempt to keep people locked into its software. ActiveX will run on PCs and (later this year) Macs, but it will not run on all NCs. The whole point of Java applets is that they can run on any computer for which someone has bothered to write a Java Virtual Machine.

So why should developers go for ActiveX when Java will reach more users? They won't if fast Java interpreters and Just In Time compilers are developed quickly enough. This is one battle Microsoft could lose.

The NC/PC debate is artificial when it is presented as an either/or. A PC with a Java-enabled browser is an NC within the meaning of the act, and many NCs will be built with PC-style applications and on-board storage.

Java and the NC offer little that is new. One rests on just another programming language like C++, and the other is a simple generic computer. But together they promise a hardware-independent architecture, which has to be a good thing. Even more important, they might just have enough momentum to establish it.

Java programs are portable to any machine. Never again need promising hardware fail for lack of a software base. Any chip can make it. Microsoft and Intel will have to watch their backs.

● *Apologies to anyone who sent us email in early June. Our gateway closed so we received no email for days. Some mail has been lost.*

Acorn in pole position

Prominent in the NC (network computer) story has been Acorn, owned by Olivetti but British in much of its history and expertise.

I've long had a soft spot for Acorn. It produced some good machines, and beat the world to market a RISC PC. Acorn companies have, for years, been plugging away at long-term projects like ATM, online banking and video-on-demand at a time when much of the country was diseased with short-termism.

I'm not sure the Web is yet ready for the home market, so Acorn spin-off NChannel may be getting in a little too early with its new access box *(see page 21)*. It uses the 7500FE chip developed by its sibling, ARM.

Acorn has already demonstrated an NC using the more powerful 200MHz StrongArm chip, which ARM developed with Digital. ARM reckons a 160MHz StrongArm is equivalent to a 150MHz Pentium but draws, at most, a sixth of the power and costs just £30.

Texas Instruments has licensed the design, which it may build with its new 0.18micron Timeline technology, making the chip even faster, less power-hungry and ideal for mobile computers.

Timeline can put 125 million transistors on a single chip, and so pack in memory and support logic to make a one-chip mobile. My hunch is that mobiles will be the most common form of NC.

Bagging the **couch potato**

Are games system Web browsers the ideal bait to tempt the TV viewing market? Tim Bajarin is sceptical.

THE ELECTRONIC Entertainment Expo in Los Angeles has replaced the Consumer Electronics Show as a major showcase for products that will be hot this Christmas. Nintendo chose the occasion to launch its 64-bit games system which is now going head-to-head with Sony's PlayStation and Sega's Saturn.

Sony cut the PlayStation's price by $100 to $199, thereby setting in motion a price war that will become very bloody this autumn. Sega promptly cut the Saturn's price to $199, suggesting that nobody is about to make money from the games hardware itself.

These companies were showing Web browsers on their machines which were being touted as ideal Internet devices to connect a TV to the Internet. But the speed of access, at best, was 28.8 baud, which is relatively slow, even in the business world.

I had experienced a nagging feeling, wandering around the show, that something was wrong, and pondering this low-speed access for consumers made me realise what was bothering me. In fact, it is the same thing that has bothered me about the network computer when it's targeted at the consumer market.

The consumer, as defined in the US, normally gets entertainment and information from the TV and is driven by a need for instant gratification. These couch potatoes do not have the patience to wait for a Web screen to come up with the info they want. Worse, a Web screen with static data, even if it is important, does not meet their expectations. They are used to full-motion video, quality audio, animation, and even 3D-like images.

So the dedicated game-system vendors are mistaken if they think that Web connection will be the salvation of their industry. Their products will have to evolve quickly and dramatically into a multi-functional digital access device, or die. A dedicated games platform is not the answer to the question, "What is the one product that brings the Internet and the PC experience to the broad consumer market?"

Bandai's formal launch of its Pippin set-top box, called the "@World" in the US, could be the answer in later versions. It is a real Mac and can play Mac CD-ROM games but, again, it will not succeed as a consumer Internet device at current access speeds. Until the Internet can deliver full-motion video, quality animation and 3D, the consumer market will not buy into the Web.

But the @World is a real computer, albeit a limited one, and uses the local CD for fast access to information, applications and data. I call it "Digital training wheels for the couch potato" because it provides the same interactive CD experience as a PC but uses the TV for display. And while the gratification from the CD is not instant, at least it is much faster than the Internet can deliver today.

I think the first @World will be a bust. It will be panned by users who buy it for the Internet, and currently it has no upgrade path. Its real promise will come when DVD ROM (Digital Versatile Disc) becomes available for consumer use. Imagine having a single machine connected to the TV that plays existing CD-ROM titles, DVD movies and can deliver 3D or VR-based virtual worlds.

It will take years for the Internet to get the kind of broadband pipes in place needed for real-time full-motion video, audio and 3D. I believe DVD will be used to deliver the bulk of the graphics needed for VR games, chat rooms and the like, with the Internet delivering the instructions, storylines and other data.

A look to the future of games consoles and the Web

ANALYSIS

Photo opportunity

One of the few significant announcements at last month's Comdex, in Chicago, was that of a Kodak digital camera costing less than $350. Sub-$600 products from Casio, Epson and Apple have sold largely to business users but prices will have to drop well below $500 to attract consumer sales. Casio recently dropped the price of its QV-10 to about £299 in the UK. Now, Kodak is betting that its DC 20 at $350 or less (but around £350 in the UK, see *Newsprint*) could start a serious move to digital photography.

Kodak thinks film-based photography will become even more popular with PC users, as photo scanners become embedded in PCs, as in Hewlett-Packard's Pavilion.

This new camera can hold eight pictures in the high-resolution mode (493 x 373) or 16 in lower resolution. It comes with cables and software for both the Mac and PC, and will ship in Europe this autumn.

Back to its **roots**

Graham Lea looks at how Borland hopes to rebuild past fortunes by returning to what it knows best.

New Borland CEO, Gary Westel, thinks the company's future lies in its past, with tools, languages and frameworks

ANALYSIS

BORLAND HAS BEEN through some rough times in recent years, but now seems to be positioning itself for leadership in the tools and languages market.

Philippe Kahn, who founded Borland, challenged Microsoft in the languages sector in the early eighties with TurboPascal, which resoundingly beat Microsoft's Pascal, since it ran directly from an editor. Programmers loved TurboPascal, not least because it was sold for about 15 percent of the price of Microsoft's version and so began the movement towards lower software prices.

This experience also gave Borland a good foundation for Delphi, an object-orientated rapid application development tool, since its underlying language is Object Pascal. Borland's SideKick also provided a very successful terminate-and-stay-resident capability in DOS.

In 1990, Lotus challenged Borland for allegedly copying its 1-2-3 menu command system. The case dragged on for years, but Borland was eventually exonerated by the US Supreme Court. Along the way Borland became unfocused, sales fell and strategic errors were made, including the payment of $440m for Ashton-Tate's dBase, although this did give Borland control of 80 percent of the PC database market. Kahn's fiefdom ended with his departure.

By savagely cutting staff and all costs except R&D, Borland's new CEO, Gary Westel, has returned Borland to modest profit. However, in the latest quarter, Microsoft used its financial muscle against Borland with predatory pricing for Visual Basic, creating a sales obstacle for Borland and a loss. Westel withdrew from the suites war and does not regard dBase, Paradox or Interbase as strategic products, even though it was decided that their lives should be extended.

Westel returned Borland to its roots in tools, languages, components and frameworks. There are fewer crises and less vision than in earlier days, but the share price remains in the doldrums.

Microsoft was an early entrant into the rapid application development tool market with Visual Basic (VB), but Borland dismisses VB's popularity as being primarily among hobbyists.

Borland's relationship with Microsoft these days is cordial at a technical level, since Borland toes the Microsoft line. David Intersimone, Borland's head of developer relations, told me, "We make our money because Microsoft systems are successful." Borland has the advantage of not having Microsoft's religious need to tie developers to its NT platform and back-end products.

Delphi's strength lies in its ability to see an application through, from prototype to production, with performance advantages up to 20 times greater than VB, because of Delphi's native code compiler. Delphi enables both object and component-based development, and the extension of component capabilities via inheritance from OCXs and VBXs.

In its first year, Borland sold 350,000 copies of Delphi, more than rivals Power Builder and Gupta tools combined, have ever sold. Other products in this market include Forte, a high-end application, and Oracle's Power Objects, which works with the Mac but does not have ODBC support.

Borland's $64m acquisition, in May, of the Boston-based Open Environment Corporation (OEC) is intended to accelerate growth in the client/server market. OEC pioneered three-tier client/server architectures. Borland will use OEC's Entera middleware to process business rules for its tools.

Borland enthusiastically supports Java. Latte is Borland's forthcoming Java-based development tool, an Interbase SQL Server written in Java was recently announced, and a platform-independent Java component model, BAJA, has been demonstrated.

Netscape is including Borland's "just-in-time" (JIT) accelerator for Java applications in future versions of its Navigator product, with the result that Java applets should run between five and ten times faster. Sun also licenses Borland's JIT for its Java development kit. Willows Software, an innovative developer of a Windows API for cross-platform development, has licensed Borland's Object Windows Library (OWL) for cross-platform development. These are heavyweight endorsements of Borland's capabilities.

Ultimately, Borland's success or otherwise will depend on how it fares in the corporate market. At present, 20 percent of its business is in the client/server area. Four times as many people were at the recent Borland developers' conference in London as at the MS Access developers' conference a few weeks earlier, which augurs well for Borland. It seems that the old flame still burns.

● Graham Lea is an independent computer industry analyst. Email 100137.655

Computations

BY ROWLAND MORGAN

Flop discs

Ridiculous sums are being spent, unsuccessfully, trying to digitise books. The Murdoch organisation in London boasts £500,000 spent on its Makers of the 20th Century CD-ROM — about £2,500 per biographical listing. Entry-for-entry, this would price Encarta at about £50m. In spite of such an outlay, the Makers disk must be one of the first ever to publish fewer subjects than its parent book. Nor is the approach very rigorous: William Randolph Hearst is left out.

Rupert Murdoch, owner of the CD-ROM's publisher (News Multimedia) is in. That could explain the suits at News International okaying the galloping expense of the Israeli-designed project, but other extravaganzas have matched it. On the

brink of their sell-off trauma last year, troubled Reed Consumer Books approved a half-million pound children's CD-ROM project which died on the shelves.

Multimedia machines are proliferating, but shoddy CD-ROMs are not selling in to their D-drives. Distributors suspect that price cuts will suggest even worse content. Several big players have pulled out.

Designers of Web sites, where hit-numbers give instant response, are forced to be more realistic. At *The Guardian's* New Media Lab, for example, *Wired* survivor Robin Hunt has torn up the online newspaper and scattered it into snippety hotlinks to be called Shift Command. These sites may be the models for more computer-friendly disks.

Down in the dumpers

Fourteen percent of computer users surveyed say they keep old equipment because there is no obvious way of getting rid of it. Many private users simply shunt kit upstairs to the attic.

Sadly, the most common alternative to resale or trade-in is dumping (at least 30 percent). Every year, City of London business dumps on the landscape about 1,800 tonnes of electronic and electrical equipment (mostly non-biodegradable or toxic): enough to load 78 juggernaut lorries. Retrospective fines cannot be charged on such dumpers because our Parliament specifically banned it (the bandits) last year.

But in the US, where toxic dumping is properly equated with tax-evasion, many harsh fines have already been retroactively levied and as a result equipment recycling is a core service offer at some big suppliers. Digital, for example, handles 13 million kilograms of reject kit a year at its combined repair/recycle plant in Nijmegen, Holland, including over 4.5 million kilos of computers. A remarkable 93 percent of reject computer material entering the plant goes back on-stream. Eighty percent of returning motherboard is reclaimed for repairs, supplementing the 63,000 different spare parts in stock. Other materials are broken down into 45 different fractions, including substantial amounts of industrial gold, silver, platinum and palladium. Shredders have been developed which can process parts into 12 different fractions at once (not here, obviously, which shows how backward legislation will enforce low technology).

Digital has painstakingly refined its 1992-launched plant into four R-streams: re-use, re-sale, refurbishment and re-manufacture. All now make a profit. Greens still dislike the centralised aspect of such an operation but Digital argues that waste equipment fuel-efficiently fills empty lorry space. Anyway, Holland seems an appropriate base for the clean-up battle: a recent official survey estimated toxic industrial sites there at 600,000.

Predictably, Digital's smallest recycling flow among northern states comes from the UK. IT recovery laws are due in Germany at the end of this year. Holland and Scandinavia expect laws soon, while here in the UK we're running a survey.

● **Source: Digital/ICER/SERA**

STATELLITE

➳ Desktop computers at the Hewlett-Packard company (H-P) require the power of 21 electric trains to run them and 78 juggernaut lorries to take them away. Watts consumed by H-P's 84,000 desktop PCs: 21W million. Watts required per train on the UK east coast main line: 1 million.

● **Source: Hewlett-Packard (@ 250W/14Kg. Juggernaut 15t) / Railtrack press office.**

➳ The eighties computer boom netted Scotland only six IT jobs a week. Scottish electronics employees in 1979: 42,500. In 1991: 45,500.

● **Source: The Scottish Office**

To hell with IT

Seventeen percent of surveyed European companies say they are not concerned at all whether computers are environmentally friendly or not, and only 31 percent say it would affect their purchasing decision.

● **Source: Digital survey**

Toxic amnesia

Forget lead, cadmium, non-biodegradable plastic, brominated flame retardants; only eight percent of companies are concerned about the safety, or toxicity problems, associated with dumping computers.

● **Source: Digital survey**

Compunundrum

Computers have demolished civil service jobs. Average monthly loss of jobs in the British civil service since 1980: 1,078… yet, during the age of computerisation, Welsh Office bureaucracy tripled. Staff at the Welsh Office in 1969/70: 766. In 1991/92: 2,399.

● **Source: Hansard**

Sounding Off

"Stalin must have had a hell of a job keeping his photograph album up-to-date. Let's suppose, for example, that one of his favourite pictures was "Me and my good mate, Bukharin, liquidating the Mensheviks and other assorted counter-revolutionaries." Unfortunately, Stalin's erstwhile comrade, Nikolai Ivanovich Bukharin, later went off in a strop and denounced agricultural collectivisation. It's always a bummer when that happens. Under the circumstances, what else could Stalin do except shrug his shoulders and phone for a firing squad?

Having dealt with the capitalist revisionist, Stalin was still left with the embarrassing photographic evidence of their former togetherness. He could have simply recaptioned it "Me and an arsehole" but Stalin preferred to amend the photograph itself to make out that the offending party had never existed in the first place. Or, at least, that he hadn't been around at the time. So he'd have him airbrushed out and a lamp-standard or rubber plant painted in his stead. It must have been a very laborious, long-winded process, demanding a great deal of skill. Today, Stalin would probably use PhotoShop and he'd be able to do the job in a couple of minutes.

Whether it's done by a megalomaniac dictator or just a newspaper employee, there's always been a question mark over the ethics of altering photographs in this way. The tabloids do it every other day: "This is how Gazza would look if he became a transvestite" or, "Lancaster bomber found on the Moon". Here though, the manipulation is usually obvious and the paper doesn't try to pretend that the picture is anything other than a fake. Everyone accepts it for what it is.

However, cast your minds back to the Fergie toe-sucking episode of a couple of years ago. The fuzzy, all-revealing photographs were taken from some distance, with a long lens. There was no dispute over their authenticity. However, suppose the pedal frolics had been witnessed by a reporter who didn't have a camera? What if he'd returned to his newspaper office, sat down at a Macintosh, and manufactured the happy pool-side tableau from archive photographs? After all, it did happen. So would cobbling together a photograph from stock images be any worse, ethically, than cobbling together a written story from stock words?

MICHAEL HEWITT

It's already being done, although not quite so blatantly. A few months ago, there were reports in the press of a growing rift between John Major and Kenneth Clark. Supposedly, it got to the stage where the two of them were virtually lobbing ink pellets at one another during Cabinet meetings. One day, they were snapped walking side-by-side in the street, each studiously trying to ignore the other. This wasn't good enough for one of the papers so the picture team digitised the original photograph and, using PhotoShop, "stretched" it, inserting three yards of pavement between the PM and the Chancellor. They then captioned it "Major Gulf", or something equally banal.

If you think this is unacceptable, what is the difference between printing that photograph and printing the sentence: "John Major and Kenneth Clark hate each other's guts"? Some would argue, I suppose, that the sentence is merely conjecture, whereas the picture would be regarded by many as positive proof. These days, does anyone still believe the camera doesn't lie? Or that photographic images can't be manipulated to tell whatever story the picture editor wants? Forget ethics in these cases.

Thanks to computer technology, we're fast approaching a stage where the photographed image, be it digital or captured on film, is merely the raw material for the final printed picture. The days of the star photographers, like the Lichfields and the Baileys, are numbered. In the future, the glory will go to the boys and girls at the computer terminals. They'll use photographic images in the same way that journalists use words: as building blocks, to cast whatever slant on the story that editorial policy requires. The Daily Express will print John Major looking commanding, surrounded by adoring acolytes, and The Daily Mirror will put a dunce's cap and a "Kick me" T-shirt on him.

It's not just the papers that are going to benefit from this technology. Today the chemist will put my photographs on to CD-ROM or if I'm feeling sufficiently flush, I can splash out on a new Kodak CCD camera that plugs into the back of my PC.

Using an appropriate paint package, I'm then able to do whatever I like with those images. Old girlfriends can be excised from snapshots and newer models dropped in, my incipient beer-gut can be reduced, making me look like a Chippendale, or I can transform my one-bedroom flat into something a little more palatial. And as PCs become yet more powerful and storage capacity increases, I'll soon be able to manipulate moving video images too. Then the sky will be the limit.

Computers are ushering in a whole new era of mendacity and duplicity. Within ten years, the only thing we'll believe is the evidence of our own eyes. In fact, given advances in virtual reality and man-machine interfaces, we might not even believe that. Stalin would be in his element.

Homefront

I had a nasty shock the other day. Someone sent me some software to review, and out of the box came 18 floppy disks.

Although by no means a record, it was a timely reminder of the bad old days... oh, nearly a year ago... when practically everything had to be installed in 1.44Mb dollops. Is there anyone out there now who doesn't have a CD-ROM drive?

A quad-speed, as I've just found out, is now cheaper than a floppy disk drive, and means you can go off and do something else while the installation chunters away, rather than hover anxiously feeding in a stack of diskettes in a tedious electromagnetic ritual.

Over 400 floppies fit on just one CD-ROM. And duplicated in bulk, one CD-ROM costs about the same as one high-density, 3.5in floppy. This means, of course, that software publishers can cram even more onto your hard disk at minimal production cost.

As it is, I've just upgraded my hard disk yet again to cope with the latest surge in software footprints. These days, you really need well over a gigabyte just to get started.

I won't name names, but I have a suite of business software awaiting installation that needs over 300Mb for the full whack. It's only a beta version, mind you, so the final release will probably bump this up a bit. A decent graphics suite will occupy a similar-sized chunk of virtual estate, and even trivial utilities such as fax software need to occupy over 25Mb to command any market credibility. That latter figure is more than an entire entry-level hard disk at the start of this decade — isn't progress a fine thing?

Intrigued by this, I did a little mathematical modelling, charting my hard disk size since 1990 and extrapolating the results to make some likely predictions. With 50 megs-worth of spreadsheet you can do this sort of thing, and plot the results in a wide variety of graphic formats.

It doesn't take too long, and it's much more fun than real work. Anyway, at the present rate of growth, taking operating system upgrades, data file entry size, cluster size and seasonal factors into account, I'll need around 60 gigabytes by the year 2000. That's a thousand-fold increase in disk size in ten years.

TIM NOTT

"...his web page health update stated that although both pulse and blood pressure were at zero, Tim is feeling fine."

This, in itself, doesn't worry me because the same set of statistics shows that a 60-gig drive will only cost £179 plus VAT by then. What I'm really dreading, however, is seeing the message "please insert CD-ROM number 18 in drive D:".

Meanwhile, on another tack, this month saw the reported death of two historic figures. Pol Pot was arguably the most gruesome dictator of the seventies, responsible for the death of millions of his own people. Technophobic in the extreme, he so hated intellectuals that he slaughtered spectacle-wearers. Let's hope his grave is licensed for dancing.

Moving from Pot to Acid, so to speak, we also saw the end of Timothy Leary. Younger readers may need reminding that in the late sixties he coined the phrase "Turn on, tune in, drop out", and is probably the reason your parents are so weird. As well as a champion and recreational user of mind-altering substances, Tim was a complete computer and internet addict. Dying of cancer, his avowed intention was to commit suicide, live online, with web video links.

The cancer, however, beat him to it and on 31st May his web page health update stated that although both pulse and blood pressure were at zero, "Tim is feeling fine". Even though Tim Leary may have seemed as mad as a hatter, compared to some of his followers he was a model of sanity. There is a movement in the US to have him canonised. I should point out that the current Saint Timothy is not the patron saint of the insane — I don't think he has a day job at all. And anyway, that honour goes to Saint Dymphna.

Meanwhile, a group of UK fans are trying to get through to the late Tim in order to get him either to predict, or influence, the outcome of the National Lottery using his Powers From Beyond. The winnings would be used to fund the "Why Not?" Foundation, continuing Leary's research and becoming, should it win every week, "the most powerful force for good in the entire history of the human race."

I'll leave the inherent contradictions as an exercise for the reader, but one of the projects he was interested in before his demise was digitising his own brain in order to make the contents available on the Internet. It is not yet known how much hard disk space this would need, or whether it will be available on CD-ROM.

Straight talking

If I had shares in companies selling the hardware boards needed to display full motion video on a PC, I would sell them. And, I'd think carefully before buying shares in any company which offers a software solution. The future looked rosy three years ago when the video industry set the MPEG-1 standard, C-Cube developed a chipset, Philips started to sell decoder boards for CD-i players and Sigma launched the first ReelMagic board for a PC.

Inevitably there were teething bugs. ROM drives would not play the first movie discs that Philips produced to the CD-i Green Book standard. Philips switched to the White Book Video CD standard but many CD-ROM drives wouldn't play those, either. The drive makers have now followed the White Book standard and other manufacturers have moved in to the market to compete with Sigma. PCs should finally be able to display full screen, full motion video. But it just hasn't transpired.

BARRY FOX

In May 1995, Ace Multimedia proudly announced that it was going to "kick start the MPEG revolution" with a £300 package of Movie Master board and over a dozen Video CDs. At a press launch, the PCs set up by Ace were giving terrific MPEG pictures, but I was wary and asked for one to try for myself. I finally received it in February, nine months later. I tried fitting it to a Dell Dimension: the feature connector leads were too short and could be plugged in either of two ways round. The fly lead, needed to connect the decoder board to a sound card, was "an optional extra" and missing. So was the "VGA Terminator" referred to in the instruction manual.

Ace sent the missing connectors and told me which way to connect the lead, but the screen remained blank. Try reversing the lead, suggested Ace. Might this damage the mother board, I worried? It shouldn't, said Ace. Luckily it didn't, but there were still no pictures. Ace suggested more fixes, but none worked. As the company had sent me a bill for £363, payable after 30 days, I returned the board requesting a fault check. Ace never got back to me, so I chased them. No, the board was not faulty, and the company would inform me when it found out why the Movie Master will not work with a Dell Dimension: two months on and I've heard nothing. So, if you've bought an Ace Movie Master and can't get it to work, take heart. You're not alone.

My experiences with ReelMagic, now RealMagic, have been miserable mainly because Sigma's helpline in California seems completely at sea. When I tried the latest Maxima board under Win95 I got error messages warning that my NEC 273 ROM drive was "Not Mode 2, Form 2 compatible" and so wouldn't play White Book Video CDs. "It is White Book compatible" assured NEC (just to be sure, updating the firmware to the latest version). But the RealMagic Maxima still refused to play Video CDs. Sigma, in California, now suddenly remembered that to make the Maxima play Video CDs, users must change their Win95 setup to run in real mode (16-bit) instead of protected mode (32-bit). How to do this, stated Sigma, is explained in the Readme.txt that comes with the Maxima board. I couldn't find it. Sorry, said Laura Singer, Sigma's international sales manager in California, it's on the RealMagic disc, not the Maxima disc. I took one look at the read-me printout Sigma had sent me and decided not to mess around with my system: "Wise man," said NEC's technical support.

Sigma promised a new version of the Maxima driver software that'll let the board play video CDs with Win95: it would be ready in two weeks. That was early March. As I write, I am still waiting. So if you have bought a RealMagic Maxima and it accuses your ROM drive of being incompatible, don't believe it. Don't mess with the PC's operating system either. Insist that Sigma provides driver software that works, or ask for your money back.

Several companies are capitalising on the mess over hardware decoding and offering software solutions. OmniMedia is selling Video CDs with MPEG decoding software on the disc, but even on a fast Pentium the pictures are coarse. Microsoft promises MPEG software decoding as a bolt-on to the next version of Win95. It claims "TV-quality video" from ActiveMovie. Although the system was developed in the UK there have been no local demonstrations. This may be because the system doesn't work as well as planned, or because the senior product manager of ActiveMovie didn't know it was developed here until I found out and told her.

Long before Christmas, Iterated Systems promised fractal-compressed movies on the Internet within a couple of months. By the end of May we were still waiting. I sure am pleased I didn't believe and report what Iterated told me.

Eidos has been promoting its video compression technology for months now, claiming that it works with a 486, 33MHz PC. But after nine months of asking for a CD-ROM demo disc to try, I have still not received one. There's always another excuse. But Eidos is still sending out press releases claiming that the technology is "currently being successfully applied in video telephony and CD-ROM publishing" — I believe it's called "chutzpah". Either that, or they think that all journalists are dummies.

Business matters

For many businesses, 1996 is the year to consider changing their PC operating system: a technical decision, made with cold intellectual rigour?

Wrong. Few things generate more heat and fury than operating systems. Anyone unfortunate enough to be wearing an "I love Microsoft" T-shirt at an OS/2 conference would stand as much chance as a Rangers scarf in a crowd of Celtic supporters.

Every operating system (OS) has its pros and cons, but few of those making decisions on the technology are detached enough to recognise all the good and bad points. In fact, it is often possible to predict the sort of person who will back a particular OS.

Let's start with the DOSsers. These are people who pride themselves on being able to do everything on a 286 with one meg of memory. They probably wear cords and sleeveless pullovers and believe that nostalgia isn't what it used to be. Their approach is great as long as you have no interest in communicating, in presenting with any style, and in doing anything different from the way you've always done it. Flexibility is not one of their strengths, though, because their whole, text-driven world depends on immense BAT files, set up to rigidly perform tasks.

Next come the Unix people. Oddly, Unix supporters in large companies are quite different from their university equivalents. A college Unix fan is liable to be so laid-back that he's fallen out the other side. In business, Unix is supported by those who place technical supremacy over usability and the waning mainframe lobby, who see it as the only true operating system on a PC. The business Unix person dresses conservatively and will often have a row of pens in his breast pocket. He will either consider graphical interfaces an unnecessary waste of resources, or will insist that everyone has 25in screens to fully appreciate the advantages of having 27 active windows

BRIAN CLEGG

simultaneously: there is no halfway house for the Unix man.

Probably the saddest of these creatures is the OS/2 fanatic. He is very bitter, feeling quite rightly that the world has treated him harshly. In the early days, OS/2 seemed unstoppable, with both IBM and Microsoft telling us it was the way forward. While few companies bought OS/2 wholesale, quite a number adopted it for their "mission critical" applications, where programs have to be stable and communications with multiple mainframes is a driving need. Unfortunately, they were soon to find that Microsoft's U-turn was a killer. The application writers never considered OS/2 a mass-market environment and many OS/2 PCs spend their time pretending to run Windows. The OS/2 fan favoured the old IBM uniform of a blue suit and white shirt long after IBM dropped it for T-shirts. Increasingly, they find themselves scrabbling to keep a hold on PCs, arguing that the Workplace Shell is logically superior to the Win95 desktop, not remembering that people want to get things done with applications, not admire conceptual superiority.

Finding anyone who admits to liking Microsoft can be difficult, but the statistics show that the world will say one thing and do another. When you can find a Microsoft enthusiast, he is usually a marketing type with a penchant for either flashy ties and double-breasted suits, or T-shirt and jeans. Those who still sing the praises of Windows 3.1 are but an offshoot of the DOSser. The rest divide between those who admire the pragmatic compromise of Win95, and those who feel it is worth going the whole hog and adopting NT. In either case, the Microsoft enthusiast has the infuriating smugness of an evangelist.

Despite the wailing from the technically-minded, it's the pragmatic solution that usually wins in business. It seems unlikely that anything will loosen the Microsoft grip on the PC and most corporates reluctantly acknowledge this. Despite the attempts of some analysts to paint a different picture, the IT news continues to feature moves from OS/2 or Unix to Windows 95 or NT. The fact is, in real business terms, there's very little you can do with another desktop operating system that you can't do with the Microsoft brood, and there's a lot of benefit from going with the masses.

The trouble with our OS groupies is that they're trying to back a horse in a race that has already been won. Although I'm not convinced of the benefits of Apple's Newton or Oracle's Network Computer, launching out in a new direction is the only way to displace the Microsoft/Intel axis from personal computing. It will only be when there's a new technology that offers the same leap over PCs that they provided over the old batch-job mainframes, that we will see a bandwagon worth jumping on. To expect the operating system to lead is putting the cart before the OS.

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Letters

Five go mad without backup

I felt I must write and express a slight concern after reading the feature, "Five Go Mad With £2000" (July). Five journalists were let loose with a couple of grand, purportedly to finance the purchase of a "Complete and usable business system". Clive Akass was obviously computerising a business that specialised in busking. The other choices were somewhat more conventional and, by and large, would make reasonable business systems. Perhaps the only questionable item being, once again, Gordon Laing's choice of wine.

The reason for this letter, however, is to point out that one essential piece of equipment was left off all the lists, just as it has been for the last few years. Quite simply, all these well thought out and carefully-priced systems lack any form of backup device other than, one would assume, a standard 3.5in 1.44Mb floppy drive.

Now, I'm not asking for a top-of-the-range streamer here; just a little something like a Zip drive or some other kind of super-floppy would do. There can be a fair amount of data stored in the average business setup, which is likely to be running the likes of Microsoft Office, maybe an organiser/scheduler, and perhaps some accounting software such as Quicken or QuickBooks. After a very short time, the security of the accumulated data is critical for the efficient running of the business, and the amount of information will make backing up to floppy disks totally impractical. In short, some sort of high or medium capacity offline storage device is vital.

James Reeves
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All shopped out: nice smiles, bottle of wine; but wait — no backup?

PCW replies: *A fair point, James. While our team fulfilled its brief of buying a PC, printer and business software, none of them included a backup device in their selections and so arguably did not have a "complete" business system. In previous years, the price point would have made it tough to include a traditional streamer, but new devices like Iomega's Zip Drive certainly make backup facilities more affordable. Definitely something to note for the future.*

Excel error

I thought I would drop you a short note pointing out an error in your recent Excel version 7 tutorial (*How to: Spreadsheets*, June). Among the cut-out boxes describing features new to version 7, you mention right-clicking on the worksheet's VCR controls to produce a list of available worksheets In fact, this is a feature of Excel version 5.

Overall, I was puzzled by your description of the update from version 5 to version 7 being more significant than from version 4 to version 5.

Among the features you describe in the article, none, with the exception of recalculation speed, seem to provide a compelling reason to upgrade. For users who don't go in for large, slow spreadsheets, there seems no significant benefit.

The change from version 4 to version 5 introduced multiple worksheets which, although a catch-up with Lotus 1-2-3, was nevertheless a compelling reason on its own to upgrade. Version 7 seems to contain no such reason, but perhaps I'm missing something?

Nick Read
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Stephen Wells replies: *Quite right, Nick. If you're happy with Excel version 4 or 5, there is no reason to change. The objective of the tutorial was to inform readers of changes in the new version, not to sell it.*

As to the right-clicking on the VCR controls to display a workbook Table of Contents. According to Microsoft, that's a feature added by Windows 95. I hadn't thought about people running Excel version 5 under Windows 95, so erroneously credited the feature to Excel version 7.

The Unix alternative

I am pleased to see that someone is helping those of us who want to get away from the Microsoft-directed system and into some other OS that utilises more of the power of the modern processors.

While Windows 95 is useful to the PC newcomer, it is slow and cumbersome and still has that 32-bit-Windows-on-a-16-bit-DOS problem. MSDOS.SYS and IO.SYS are both 16-bit, and no matter how much they try to tell us that Windows is 32-bit, things are slowed down considerably.

Unix, or the equivalent, seems to be the solution as it is a full 32-bit OS requiring less overall memory to run, and is eight times faster, or more in some cases, than Windows 95 could ever hope to be. In my opinion, a fully GUI version of Unix would be the way forward and Microsoft would be left in the wake of its afterburners.

Dale Saunders
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Why always Windows?

The time to renew my subscription to *Personal Computer World* is nearly here. In the past, *PCW* gave me good coverage over a wide range of topics, issues, applications and computers. Now it seems to have fallen into an infatuation with Windows, nearly to the exclusion of all else.

I picked up a recent back issue (April) and the article on DTP makes a point of being "Windows all the way". The Mac still holds a fair share of the DTP market, and I expect it only to be left out of a Windows magazine. No comments are offered on the poor or limited support for Adobe Type 1 fonts, which, for many in printing, are regarded as superior to TrueType fonts.

In the June issue, 50 great utilities are reviewed, almost all of which are Windows or Windows 95, with a few for the Mac and none for OS/2.

I would like to resubscribe, but to a magazine that covers the broad spectrum with a bit more objectivity and dispassion. You can't even say that no-one uses OS/2, as even you point out that Warp is outselling Windows 95 and Windows NT at retail.

So is *PCW* going back to the broader base? Should I resubscribe?

Charles Stirling
Bristol

PCW replies: *PCW has always done its best to cover the broad spectrum, but obviously we will allocate more pages to the most popular products and those of most relevance to the majority of our readers, which in this case means Windows. Warp may well be currently outselling Windows 95 in retail channels, but the latter has more users and comes pre-installed on the majority of PCs today.*

You're right that it is wrong to say no-one uses OS/2. We have regular columns on this and other formats in our Hands On section.

Avery small correction

Congratulations on the Utilities survey (*Cover Story*, June). It was a very handy guide to a host of useful products. However, it is misleading in relation to the product, Avery Label Pro, in stating that "All kinds of label formats are supported on a wide variety of paper sizes."

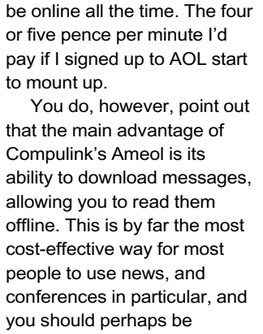
This simply isn't true. Only two sizes, 8.5in x 11in or A4, are supported for backing sheets, and only Avery label formats are supported in those sizes. You aren't able to specify a label size, or the number of labels per sheet. The Avery technical support rep was very apologetic, and confessed that the Avery Label Pro package was "Only designed to support the Avery product range."

The person I spoke to at the Avery Consumer Centre confirmed this, and pointed out that the Avery range covered "Over 50 percent of the label formats available." Your description of Avery Label Pro is thus quite wrong and ought to be corrected. The product is useless to anyone who is not using, or does not propose to use, an Avery format.

Simon King
Research Director
Military Policy Research
Oxford

Eleanor Turton-Hill replies: *True, Avery Label Pro is not intended as a tool for building custom-sized labels. I made a reference to pre-prepared templates, but apologise for not making this more explicit. Avery is the biggest manufacturer of label products in the world. It has a 70 percent market share in the UK; and in this field there are no major competitors, but instead a scattering of companies each holding a tiny market percentage.*

Being so dominant, Avery provides all-round support for industry-standard office products like labels for ring binders, floppy disks, video and audio cassettes, as well as producing specialist label paper for inkjet, laser and dot-matrix printers, so it does provide a huge quantity of label formats. It supports A5, A4 and letter-size paper, and has a huge number of templates built into the MS Office Suite. Most people in the PC business are using software that supports the standard, whether they proposed to or not.



Where the money goes

Are you people suggesting we are all made of money out here? First of all, you endorse AOL by having your discussion area on their system. If I were to follow this advice, it would be costing me three pence per minute, on top of the one or two pence per minute I have to pay BT to feed my modem. That's quite a lot of money, at £2.40 or £3.00 per hour.

In your June issue, you twice endorse Netscape as "The finest integration of mail, newsgroup and telnet access, so good you need never leave the browser" and "Unrivalled support for mail and newsgroup access". You don't point out that to use Netscape as a newsreader, you have to be online all the time. The four or five pence per minute I'd pay if I signed up to AOL start to mount up.

You do, however, point out that the main advantage of Compulink's Ameol is its ability to download messages, allowing you to read them offline. This is by far the most cost-effective way for most people to use news, and conferences in particular, and you should perhaps be highlighting other applications which offer a cheaper way of reading news. There are offline readers like Agent (PC) and News Hopper (Mac) to name just two.

John Wright
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Give me some credit

The points made (*Letters*, May) regarding AOL needing credit card details before allowing a ten-hour free trial period, and about the difficulty in obtaining refunds, are not quite fair.

CompuServe also requires billing information when signing up, either from a credit card or a bank account, so that hours in excess of the free ones can be charged for. If you don't exceed them, there is no charge whether you remain with them or not. I can't speak for AOL, but if you choose to remain with CIS, you'll find the direct-debit system is one month behind the norm in the UK. The April payment is taken from your bank account in May, which gives ample time to cancel it or to take up problems with support staff.

And yes, technology could probably cope with a pop-up reminder that your free period has expired, but as usual it's "nothing for nothing". The more you want, the more you have to pay for — and incidentally, the more I have to pay for too. So please watch how much cosseting you ask for, will you?

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What's up, Doc?

With reference to Dr Peter Styring's letter, "Keep the Mac out of the students' hands" (May), I'd like to answer a few of his challenges to the Mac.

Dr Styring is unclear as to what "optimising your system" actually means. If he means optimising a hard drive or other media, then all a Mac user needs is Norton Speed Disk or any number of shareware offerings. If he means tweaking the system for maximum performance, then I again beg to differ. Most Mac users know a lot about the innards of their machines.

Secondly, the good doctor mentions the installation of hardware and software. Well,

let me think back to when I installed a Syquest EZ135. Okay, it's coming back to me. I plugged it in, powered up, and it worked. Software? Just yesterday I installed SoftWindows 3.0. I ran the installer, and that was it.

Also, Dr Styring mentions Word and PowerPoint as "trouble" applications. Switch to WordPerfect and FreeHand, Doc! Microsoft products for the Mac are infamous for lack of speed and memory-hungriness.

Last of all, what is wrong with a point-and-click OS?

John Gibbs
jester@moose.co.uk

Teaching Fox the fax of life

I write with reference to Barry Fox's two recent articles *(Straight Talking)* regarding fax software. While partially agree with him about the reliability of fax software, I think he is missing the point about fax software and fax modems in general.

In a business or office situation, a standalone fax machine on a dedicated line will always be more practical than a PC, which must carry on with other multiple tasks.

However, a fax modem makes an easy alternative for sending letters and other documents which have been created on a PC. It is practical for home use, where it would normally have to share the phone line and would only receive occasional use.

One should also not forget that the PC is now used extensively in business for sending mailshots by fax, and in fax-on-demand systems.

David Pinfold
Oxfordshire

Compact comments

I have looked at the results of your Project Management review (June) and am extremely disturbed by areas of the ACOS Compact review, which are misleading and, in some cases, incorrect.

Following your introduction and installation comments, you state that "ACOS Compact approaches projects in a unique way by asking you to map out the Work Breakdown Structure before task entry". This is wrong. You can start a project from either the Barchart Editor, the List Editor, or by the WBS Editor, a unique feature.

Your review goes on to say that "The first thing you are required to do is build the mask or template for your WBS coding. Instructions suggest you set the level structures to two, five and eight". This is incorrect. It is not the first thing you need to do. Furthermore, it should have been obvious that the level structures of two, five and eight were just for the example in the *Up and Running* booklet, which in Section One states, "As an example we will set up a small project called TEST as follows". You've got the chance to have an Activity code of up to 24 characters. You don't need to have a complex Activity code or separators, and could name your Activities 1, 2 and 3, or A, B and C.

In your table of features, Compact is shown as having no PERT views. This is wrong, because apart from being able to start a project in the Network Editor, there are screen views and obviously print outputs available.

Your review of Compact concentrates almost entirely on the idiosyncrasies resulting from this first conversion of the program to function in a Windows environment. It fails to review the product as a project management tool, and therefore unfairly excludes nearly all the key features of the product. Project management features start with examining WBS, and this has been misinterpreted and incorrectly reported.

David Buckingham
Director, D&L Computer Services, Lincolnshire

Michael Eagleton replies:
ACOS Compact was included in the project management group test because, in my opinion, it had a unique approach to project management which marked it apart from the other packages: for example, using the Work Breakdown Structure codes as the key to project construction.

I focused on this aspect in the review because the software worked best in this way, and especially because I felt the emphasis from the manuals and tutorials would lead a new user to use ACOS Compact in this way. The review marked out the good points and bad points of the product, and conveyed a fair impression of the product that, I feel, potential users will recognise. As you are very familiar with ACOS Compact, I welcome your comments about alternative methods for using the product, not covered in the review.

I look forward to the full Windows version 7.0 later in the year.

All round the houses by the direct route

Like Julian Morgan (*Letters*, June), I sent off a specification for a new PC costing around £2,000.

Viglen, Adams, Evesham Micros, Amari, Dan and SMC were all mailed, either by fax or email. Only Viglen, Adams and Dan responded directly. The others did not reply at all, although SMC did ring me up ten days after the message, wanting to give me information over the phone. As I don't take shorthand and had already placed an order elsewhere, I declined.

The responses I did get were quick but mainly concerned the companies' off-the-shelf machines rather than my specific request. Never mind; I chose Adams Technology because it is based only 15 miles away and had been quick to answer the follow-up questions I had asked. Additionally, Adams did not object to my wanting to collect, thus saving myself time and the carriage cost of £20 (plus VAT).

Collection day came but the machine was not ready. Apologies were accepted because of a suspect hard drive fault. Ah well, the next day would be okay. I could wait. The following day everything seemed fine, except there was no invoice. I took the boxes anyway, got home and opened my presents. The specified Novell Perfect Office Standard was missing; the specified Matrox card had been replaced with a Number 9 FX 300 which, Adams later claimed on the invoice, was a 9FX 771 Motion.

The six-speed CD-ROM drive was now a quad-speed, the Windows 95 keyboard was a standard keyboard, and there was no documentation for either the graphics card or the CD-ROM. It seemed that I had waited ten days for a machine the company just happened to have hanging around in the workshop. I had been debited for the full spec set out in their quote.

I then started trying to get things put right. I was promised an on-site upgrade, which the company never arranged because ICL, the contractor, is apparently not there to change parts that aren't broken.

After numerous faxes and calls over a period of ten days, I eventually agreed to keep what I had got and have the price adjusted. There was no way I was going to have it collected and upgraded as I had lost all faith in the company by then.

Hopefully, I will eventually

get the missing manuals. I may even get an answer to the email questions I posed to Adams' support service, like 2Mb of damaged sectors on the 1.6Gb HDD?

The machine is fine up to now, well-made and nice-looking, but it's not what I ordered and paid for. The moral of the story? Don't bother with direct suppliers any more. They are not interested in private customers, it seems.

I belong to a computer-orientated family. Eight of us are on email and two of us are software engineers and/or contractors. We talk to lots of people in the industry, and this story is not unusual in showing the direct suppliers in a poor light.

Peter Collins
100043.2176@
compuserve.com

Write? Wrong!

Having just received my first CompuServe subscription billings on my credit card, I contacted CompuServe to request VAT receipts. I was told that I had to write to the Customer Information Department at CompuServe Information Services.

I asked whether I could phone, fax or email this department but was told I couldn't. An internet provider that will only accept a request by snail-mail? Come on CompuServe, what business are you in?

Richard Woolf
101470,2561@
compuserve.com

US weights spoil the broth

I have been considering the purchase of one of the many cookery CD-ROMs on the market for some time, so I looked forward to your review in the June issue.

Unfortunately, you failed to judge the products on the one feature that makes me hesitate to buy. That is, their suitability for the UK kitchen in respect to weights and measures.

Most UK kitchens now have both imperial and metric scales, but most of the US-sourced material contains only US units. Ideally, a CD-ROM would be able to provide a shopping list with packaged goods in metric and loose goods in imperial, as is current practice in UK shops, with the ability to change to all metric when this happens in a couple of years.

I stopped using the Cooks forum on CompuServe several years ago. The effort required to convert US measures to metric and look up alternatives for ingredients not available here, was not worth the end result.

The ability to choose the unit of measurement in which one wishes to work should be an easy feature to implement, and would give a CD-ROM published cookery book an advantage over its paper-based alternative. Very few publishers have chosen to do this.

This failure to note the non-UK nationalisation of products seems to be a trend in what are otherwise excellent product reviews. As this is a most important factor for software that may be used by children, I hope that in future you will address the lack of UK terms and measures as a serious failing of a product to be sold in the UK marketplace.

Mark Easterbrook
100265,1323@
compuserve.com

Kodak DC20

Measuring just over 60mm x 100mm and weighing 133g (without battery), Kodak's new £349 DC20 digital camera is about as consumer-friendly as you can get — it even looks like a conventional compact 35mm camera. The 1Mb internal memory can store up to eight images at the highest 493 x 373 pixel resolution, or 16 images at the lower 320 x 240 resolution. Images can then be downloaded onto a PC or Macintosh using the software supplied. The camera is completely automatic, and will set focus and exposure for you.

Price £349 (inc. VAT) suggested retail
Contact Kodak 0800 281487; http://www.kodak.com

Casio QV-10a

Digital cameras have been around for ages, but Casio's fully-automatic QV-10a was the first to be small and good looking — essential requirements for the vital consumer market. It measures a mere 130mm x 66mm x 40mm and features a unique built-in 50mm colour LCD panel on the back. The camera is held away from your face and the panel used as a viewfinder, similar to a recent breed of video camcorders. Lonely or vain photographers can rotate the lens through 90 or 180 degrees for self-portraits, too. The downside is a relatively low resolution of 320 x 240 pixels, but the built-in 2Mb flash memory can store 96 images at this setting. A supplied serial cable is used to download the images onto your computer.

Price Around £399.99 (plus VAT) ● **Contact** Casio 0181 450 9131

Gadgets

PCW **Gadget** Photography by David Whyte

Canon PowerShot

Canon's PowerShot digital camera, exclusive to *PCW Gadgets*, takes care of focus, exposure and flash. Unlike many digital cameras, it features an optional wide-angle lens. The highest resolution is above average too, at 800 x 600 pixels. Images can be stored in the internal memory, or on an optional PC Card. The internal memory stores four images at the highest resolution, or nine at normal, or 16 in economy. In normal mode, a 4Mb flash PC Card will store 38 images, while a 170Mb hard-disk PC Card can fit a whopping 1,500 images; you can even record an 11-second audio message with each image. After snapping, download the standard JPEG images to your PC from the removable cards, or via your parallel port. The PowerShot 600 measures 159mm x 92mm x 57mm, weighs 380g excluding battery, and is expected to cost less than £900 when released later this year.

Price Expected to be below £900
Contact Canon 0121 680 8062

Per4mer Turbo Wheel

Racing-car games on today's PCs can get pretty realistic, but how about going just a bit further and swapping your joystick for a steering wheel? SC&T2 offers no less than five versions of its appallingly-named Per4mer Turbo Wheel, designed specifically for the Sony Playstation, Nintendo Super NES, Panasonic 3DO, Sega MegaDrive and, fortunately, IBM PC compatibles. Phone SC&T2 to find out whether it's compatible with your fave driving game, hand over your hard-earned's, and get ready for the ride of your life — or something along those lines.

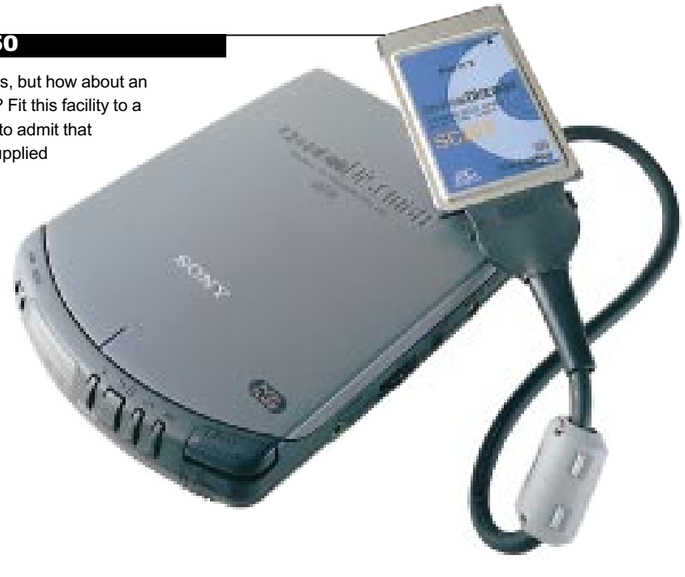
Price RRP £49.99 (inc. VAT) ● **Contact** SC&T2 0181 449 6565

Compaq scanner keyboard

Cute is the only way to describe this combined scanner and keyboard from Compaq. The scanner itself is the award-winning Visioneer PaperPort Vx, while the PaperPort software is one of the easiest and most adaptable packages around. With it you can file, fax, copy and OCR using TextBridge. This combo-keyboard is beautifully neat and compact, but it does come with more than its fair share of cables and power supplies. By the way, if you buy the Presario 7226, it comes as part of the deal.

Price RRP £275 (plus VAT)
Contact Compaq 0990 134456

Sony PRD-250



We all know CD-ROM drives can play audio discs, but how about an audio CD player which can read CD-ROM discs? Fit this facility to a good-looking portable CD player and you've got to admit that Sony is on to another winner. The PRD-250 is supplied with an Adaptec SCSI PC Card which will slot straight into your notebook — both the card and device are claimed as plug'n'play. All you have to do is slot it in, remove your Queen CD, and you've got a fully functional, quad-speed, CD-ROM drive. It weighs only 291g (without batteries) and a set of 4AA's will supply 12 hours of music, or two hours of CD-ROM playback. Surely the coolest accessory to have on the move, it even comes with headphones, but we don't advise listening to your Microsoft Windows CD.

Price RRP £349 (plus VAT)
Contact Sony 0181 760 0500

First Impressions

That famous French phrase "ooh-ahh" is not exclusively meant for Eric Cantona: Digital's HiNote Ultra II had our reviewers gasping in appreciation, too. Works 4.0 has an impressive array of optional reference works, Corel's WordPerfect Suite is for Windows 3.1 diehards, and Canon's MP10 aims to be the ultimate all-in-one solution.

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VNU European Labs

VNU Labs tests cover every kind of hardware and software including PC hardware, printers, network products, modems and software applications. The tests are continually developed and enhanced to reflect hardware and software developments.

Our tests closely simulate real-world use. For example, our suite of PC benchtests uses complete versions of industry-standard Windows 95 applications — currently Word, Excel, WordPerfect and FoxPro. We also run a graphics re-draw test using CorelDraw 6, and a Doom 2 frame rate test which is a good indication of games performance.

Application tests are the backbone of all the VNU Labs system evaluations but it's nearly impossible to pin an application result to a specific machine component. Only system-level tests (also known as low-level tests) can reliably tell the difference. VNU Labs' system-level test suite is called Euromark. The tests, which are mainly Windows-based, are used to isolate specific components like hard disks, graphics cards and CD-ROM drives.

● To make them easy to read at a glance, all graphs in *PCW* are drawn so that the bigger the bar, the better the result. Normally we'll also include the original data we worked from: for example, the time in minutes and seconds to print a page in a comparative test of printers.

HARDWARE

Digital HiNote Ultra II CTS 5120

This featherweight notebook is compact, good-looking and powerful.

Judging by the "oohs" and "aahs" emanating from the review editor's desk, you would think that Monsieur Cantona himself had walked into the *PCW* office. However, it wasn't the enigmatic Frenchman, but the new Digital HiNote Ultra II that was causing the excitement. There have been small notebooks before, but none with the power or good looks of the Ultra II. Packed inside this tiny box is a Pentium 120, a 1.1 Gb drive and 16Mb of RAM, expandable to 40Mb.

The Ultra is a remarkably compact device, shorn of any of its bolt-on extras. Indeed, it's no bigger than a ladies clutch bag, and smarter than most. At just 28mm, it's one of the slimmest machines on the market, and weighing 1.8kg including battery, one of the lightest. Standard bolt-on is the floppy drive wedge which also boasts one PC Card slot for two Type-II or one Type-3 card, while network docks and CD-ROM drives are available as extras. The Ultra, without any bolt-ons or docks, also features an identical, single PC Card slot.

The battery design is clever in two respects. It attaches to the back of the main unit and then flips down to double as a keyboard rest. Some may balk at the thought of using the battery in such a way, but it's a smart piece of industrial design as long as the hinge holds up over time. It looks strong enough.

Inside, the battery itself uses lithium ion technology which Digital claims will give three to five hours use. I was lucky to get three. One advantage of lithium ion is you don't have to wait until the battery is fully drained before recharging.

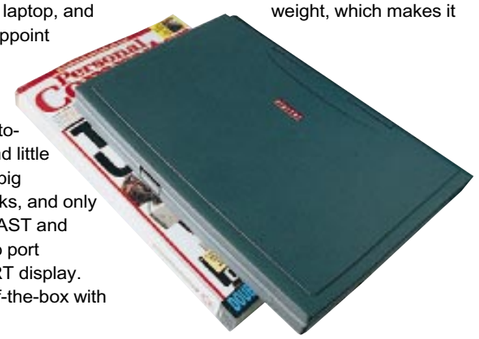
Being so compact, the keyboard obviously gets compromised, but even without any IBM-style butterfly mechanism the Ultra proved roomy enough to use. The wristpad, trackball and mousepads all work well together and the machine has a feel of serious ergonomics at work. The keyboard itself feels silky and the only problem I had was sometimes hitting the Insert key instead of Enter. Bounce was not a problem unless you really walloped the keys. The function keys were admittedly tiny but this is something I could live with. Altogether, this is one of the most well-designed notebooks in terms of ergonomics, and it's a pity that the Taiwanese cloners and others don't take more notice of this important science.

Less ergonomic is the bolt-on, wedge-shaped floppy drive that screws on to the rear half of the Ultra's bottom. Getting floppies in and out of this proved tricky, being so close to the desk surface.

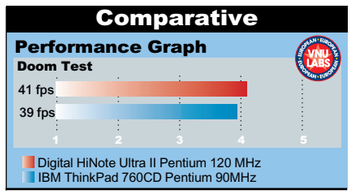
Screen technology is the other main consideration when buying a laptop, and here, the Ultra II doesn't disappoint (and shouldn't, considering its price). For your money you get a crisp 10.4in SVGA TFT screen which has edge-to-edge 800 x 600 resolution and little discernible submarining. It's big enough for most portable tasks, and only the superscreens from IBM, AST and Toshiba can better it. A video port enables easy access to a CRT display.

The Ultra II is ready out-of-the-box with Windows 95 pre-installed, as well as Digital's own notebook tools and LapLink IR software to use in conjunction with other office IrDA-compliant devices. Perhaps of more immediate use to many will be the built-in DMI support for networking. The Ultra's IR port is on the right-hand side of the box along with speaker-out and mic ports.

The new Ultra has everything you would expect of a notebook at this price range and competes with the best. But where it really scores over its rivals is its unprecedented size and weight, which makes it something of an advance in notebook design. Altogether now, ooh-ahh, HiNote Ultra!



PJ Fisher



PCW Verdict

Good Points Compact and light with workstation performance. Clever ergonomics.

Bad Points Awkward floppy drive, battery-life below average. Expensive if you add CD-ROM and docking station.

Conclusion Bang up-to-date portable which will worry IBM and Toshiba, and delight weight-conscious business users.

Price £3,679 (plus VAT. Price as tested)
Contact Digital 0345 227228

SOFTWARE

Microsoft Works 4.0/Bookshelf 95

Get integrated the easy way, with an option to bundle seven reference works.

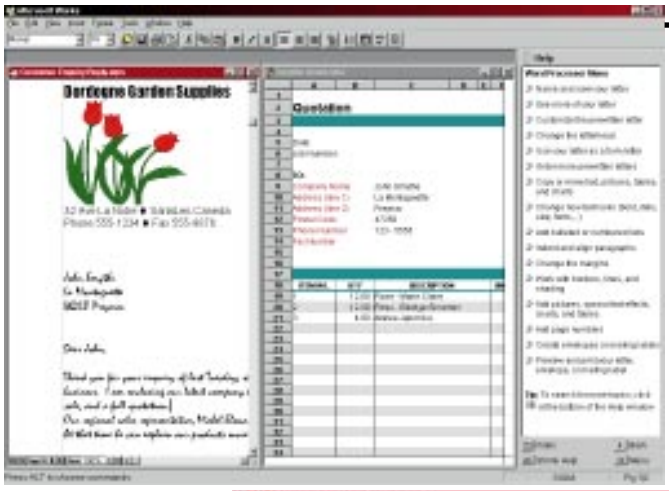
You'll need Windows 95, up to 30Mb of disk space, a CD-ROM drive and a recommended 8Mb of RAM to install this latest version of Microsoft's integrated package. As always, the emphasis is on ease-of-use, and no previous experience is required.

From the Task Launcher screen you can open existing files or create a new document, either from scratch or based on a template. For more complex tasks, such as creating a newsletter or a mortgage table, Task Wizards lead you by the hand through a series of question-and-answer screens. Once this is done, you're still not left alone, as a context-sensitive help panel fills about a third of the screen. This can be changed to a button and the document will automatically resize to fill the vacated space.

Word processing is straightforward. As with all the modules, there's just one configurable button bar. You get drag-and-drop editing, a thesaurus, Smart quotes, columns and automatic hyphenation. New to the program is Easy Formats, which lets you store named formatting combinations and apply them with a single command, and Easy Text, which allows you to store any common text such as "Yours sincerely" or a long "terms of business" section.

The spreadsheet features 256 columns, 16,384 rows, and 76 functions. There's a good range of charting options, and a button on the toolbar for autosumming a column or row. The database is easy to use, and continues the Works' tradition of designing-as-you-go. If you decide your contacts database should have a space for email addresses, you can add this without having to switch to "form design" mode.

Object linking and embedding (OLE) means you can insert a chart or spreadsheet, for instance, into a word document. Double-clicking on it will change the menus and toolbars to suit, so you can use the spreadsheet tools inside the word document. A selection of other OLE applets include a drawing module, equation-editing, WordArt (for fancy typographic effects) and sticky notes. There's also a selection of fonts and clip-art, and a communications module offering rather more than Windows 95 Hyperterminal. As with previous versions, there's the very handy "Dial this number…" command available from all modules, something Microsoft Office users still don't have.



Left *All you need for small business, with plenty of help*

Right *Never be lost for words with Roget's Thesaurus*

But this isn't all. For an extra £20 on the suggested selling price of Works, you get Bookshelf 95 on the same CD. This consists of Roget's Thesaurus, the American Heritage Dictionary, the Columbia Dictionary of Quotations, the World Almanac 1995, the Concise Columbia Encyclopedia, the People's Chronology, and the Hammond World Atlas all bundled together with a neat search engine that lets you explore one or more volumes at the same time.

Inevitably there's a strong US bias, especially in the almanac. There is every statistic you could want to know on football, but this is the American variety. Our own football has just one line.

The thesaurus is much more informative than the word processor's built-in version, and full of useful words such as triskaidekaphobia, a fear of the number thirteen. Best of all, however, is the dictionary of quotations. Here the US content is far less dominant, although there's a good selection from Woody Allen. Angela Carter and Derek Jarman clock up 37 quotes between them and Defoe, Degas and Day (Robin) all have their say. I'll leave the last word, however, to an anonymous contributor to the BBC's "Quote Unquote": "To err is human, but to really foul things up requires a computer."

Tim Nott

PCW Verdict

Good Points Straightforward integrated package. Ideal for beginners. Seven hefty reference books.

Bad Points US-slanted content to some of the reference.

Conclusion "It is vain to do with more what can be done with less." (William of Occam, 1285-1349)

Price £99.99 (SSP inc. VAT)
Contact Microsoft 0345 002000

HARDWARE

OkiPage 4W

A small, low-priced laser, producing high-quality print.

Until recently, laser printers have been costly, oversized and lacking in adaptability compared to inkjets. The OkiPage 4W sidesteps these complaints. At only 15cm x 31cm x 19cm it is very small, and at £279 (plus VAT) it is competitively priced.

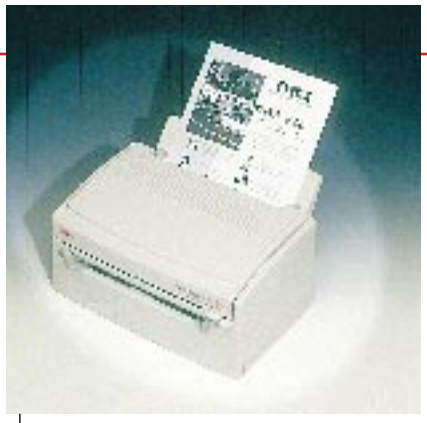
Oki describes the 4W as having 600dpi *class* resolution. There are 300 LEDs, but using Oki's MicroRes technology, the output is claimed to be equivalent to that of a 600dpi printer. Each LED, when fired at 100 percent power, is responsible for creating one dot located directly under that LED. When adjacent LEDs are fired at 70 percent power, the overlap of light from the two LEDs is over 100 percent and so allows for a dot to be created between them, effectively doubling the resolution to 600dpi.

It was relatively simple to install the drivers under both Windows 95 and Windows 3.1. The 4W is a Windows Printing System printer and will only operate under Windows 3.1 or 95.

As soon as you've rebooted after installation, the drivers try to make contact with the printer. If there's a problem, it will slow down your machine significantly, although you can close the connection process. The printer-status monitor window can be minimised but not closed and, in Windows 95, it doesn't sit tidily on the taskbar.

Despite these annoyances, the 4W does exactly what a printer should — it produces high-quality print quickly. It can deal with large graphics in a fraction of the time taken by an inkjet, while text output is dense and precise.

It's cheaper than the other cheap lasers we've seen recently, and compares favourably with them on quality. If you need good black-and-white print, you could do worse than this.



Oki-dokey: good-quality black-and-white print from the 4W

Adele Dyer

PCW Verdict

Good Points Fast, good-quality printing.
Bad Points Annoying on-screen print controls.
Conclusion Good value.

Price £279 (plus VAT)
Contact Oki Systems (UK) 01753 819819

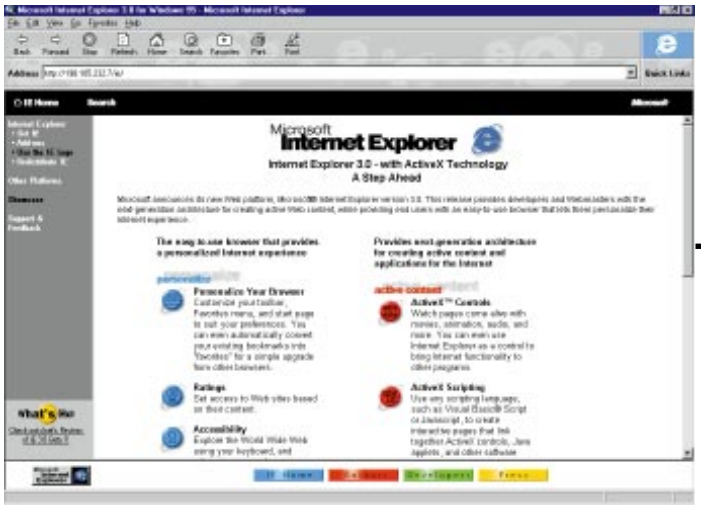
SOFTWARE

Internet Explorer 3.0

Microsoft takes Web browsing to the limit.

Internet Explorer 3.0 is no longer just a Web browser. It's a mini operating system in itself, with clues to how Windows 97 will look. The version of IE we tested in our June issue had the functionality, but gave no hint of the fine job Microsoft would do on its interface. Explorer 3.0 looks simply outstanding and proves that Microsoft's codeheads have moved from pale imitators to genuine innovators. Check out the new menu bar where monochrome icons turn into colour as you drag the mouse over them. Underneath, a mouse click switches the address bar into a series of quick links, including a Web tutorial. Netscape Navigator and everyone else's browser suddenly look dated.

Explorer's real ace is the new ActiveX support. It's possible to view any Office document without leaving the browser. The application and file opens inside the browser along with a complete menu bar. Open Office documents can be revisited by hitting the back button or History list, and files on local drives or LAN are now accessible direct from the browser. With such integration, Microsoft is blurring the distinction between normal documents and Internet documents.



IE 3.0 — A Web browser that's better than the rest

Overall performance has improved dramatically. Text now zips up followed by graphics, and cached pages appear instantly. IE 3.0 supports frames, but goes further than Netscape by displaying seamless frames, those without borders. This beta doesn't yet support Java or Netscape plug-ins but these will be in the final version, released in the autumn. In truth, you don't miss them.

You are still going to need Windows 95 (or NT 4.0) to get the best out of IE 3.0, but that doesn't detract from the fact that this a major advance and an enticing glimpse of the future.

PJ Fisher

PCW Verdict

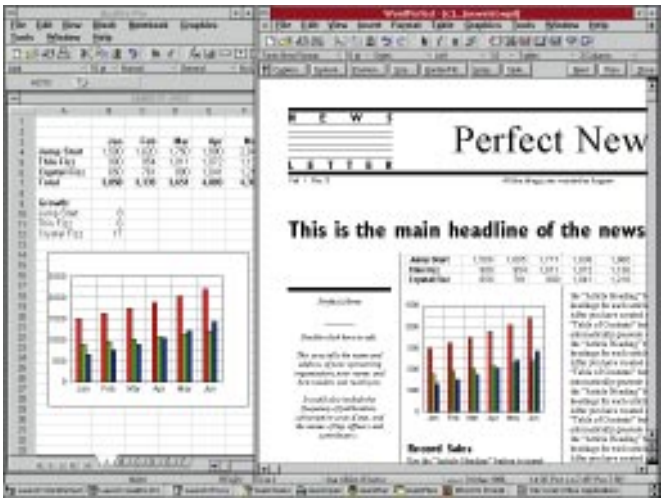
Good Points Fast, state-of-the-art interface design, ActiveX integration that works.
Bad Points No Java support as yet.
Conclusion If you use Windows 95, this is an essential piece of software.

Price Free download (and on *PCW* cover disk)
Contact http://www.microsoft.com/ie

SOFTWARE

Corel WordPerfect Suite

If you're still with Windows 3.1, this is especially for you.



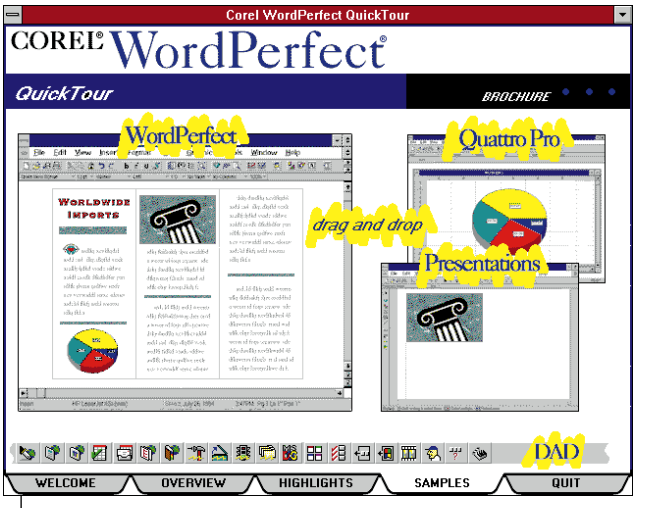
Here's the good news for all those who haven't yet been invited to the Windows 95 ball: a whole new suite of applications for Windows 3.1.

Now, when I say new, this is a bit of an overstatement. The three main courses are WordPerfect 6.1, the Quattro Pro 6.0 spreadsheet and Presentations 3.0, which are all well-matured versions. If you want a database, then you need Corel Office Professional, which includes Paradox. Side dishes include CorelFlow 2, Envoy (electronic publishing), Dashboard 3, Sidekick 2, the Desktop Application Director (DAD), screensavers, 150 fonts, and various add-ons for WordPerfect itself, including grammar checking, graphics and Web-page publishing.

All this will eat up to 140Mb of hard disk. And that's not counting the 370Mb of clip-art and photos on the CD. Installation could be better designed. You have to go through the process twice, once for the main components and once for the extras. In fact, I had to go through it three times in order to upgrade my existing version of Dashboard. The suite was tested on a 486 DX2/50MHz PC with 16Mb RAM.

When you restart after installation, you'll discover DAD sitting at the bottom of the screen, which is a toolbar controlling the various components, similar to the Microsoft Office Manager. Fortunately there's a Quick Tour that runs automatically the first time, providing an overview of the various components and how they fit together. There's lots more help including "How do I?" sections, tutorials, coaches and experts to assist with complex tasks.

There's a good consistency of look and feel across the three major components, and OLE 2 means you can drag and drop data between applications and edit embedded objects "in place". However, with several WordPerfect and Quattro Pro files open, my Windows system resources were almost exhausted.



Top *Taking a tour: there's a lot to see, so a guide helps.* **Above** *Dragging and dropping from Quattro Pro to WordPerfect, with DAD down below*

WordPerfect itself is a very sophisticated word processor, but the interface, with its proliferation of different kinds of button bars, takes some time to master. On the plus side, its tabling beats all competitors, with nearly 100 spreadsheet-type formulae, and its file management is excellent. There's a Smart Find-and-Replace which tackles word forms. For instance, you can change "buy", "buying" and "bought" into "purchase", "purchasing" and "purchased" in one pass.

Quattro Pro 6 is a 3D spreadsheet. As well as columns and rows, you have 256 worksheets and one extra sheet that contains thumbnails of all the graphic elements, such as charts, in the file. You get in-cell editing, data modelling, a Formula Composer and more Analytical Experts for difficult calculations. Presentations is a direct descendant of PerfectDraw, probably the best DOS drawing package of its time.

You can create slide shows containing sound and video with a range of transition effects. There's TWAIN support so you can scan photographs straight in, and you can base a presentation directly on a WordPerfect outline. CorelFlow has 2000 drag-and-drop symbols which can be dragged and dropped to create all kinds of flow or organisational charts. Lines are "smart" so you can drag objects around without breaking the connection.

DAD, as mentioned before, can sit anywhere on-screen and provides not just access to the modules, but also Quick Tasks. This can be anything from creating a business report to scheduling a trip using WordPerfect or Quattro Pro Experts. Going further than this, version 3 of Dashboard is a replacement shell for Program Manager, with a Windows 95-style taskbar, quick printer access, built-in poker and a one-armed bandit for those who think Solitaire is for wimps. Finally, Sidekick provides a contact manager, calendar, call-logging, till-roll calculator and other desktop utilities.

The special upgrade price is open to anyone with CorelDraw 3 or Ventura 4.2 (or later versions), or any word processor, spreadsheet, suite or integrated package from Microsoft, Lotus, Novell, Claris or Borland.

Tim Nott

PCW Verdict

Good Points An awful lot of software for the money.

Bad Points Nothing astoundingly new in the major components, and hammers Windows system resources.

Conclusion Good value for those still computing in 16-bit.

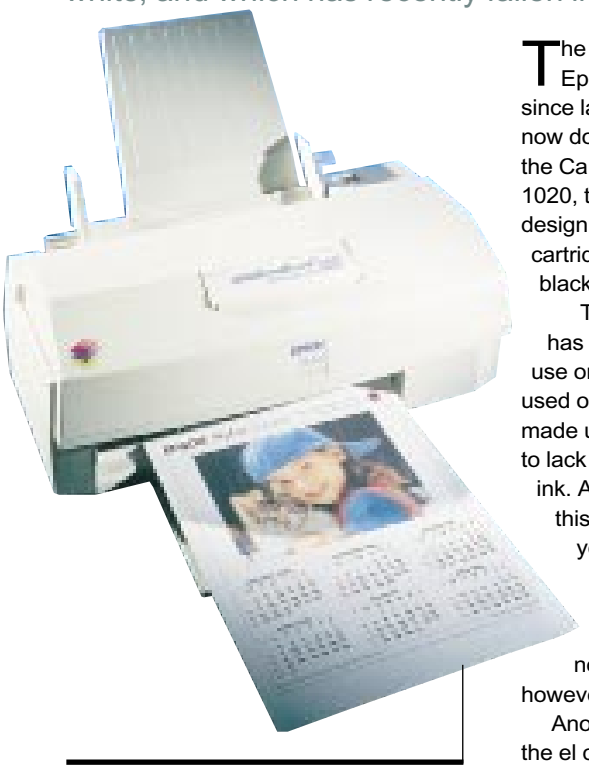
Price £199 (plus VAT); crossgrades/upgrades £89 (plus VAT). Office Pro £399

Contact Channel Market Makers 01703 814142

HARDWARE

Epson Stylus Color IIs

An inkjet printer which can print in both colour and black-and-white, and which has recently fallen in price.



The Stylus Color IIs is the baby of Epson's inkjet family. It's been around since late last year and its street price is now down to about £170 (plus VAT). Like the Canon BJC210 and the Lexmark 1020, this model is of the standard budget design with a three-colour (CMY) cartridge which can be swapped to a black one for plain text printing.

The swappable cartridge design has its disadvantages. You can only use one cartridge at a time, so any black used on colour images is a composite made up of the three colours, which tends to lack the solidity and depth of true black ink. A lot of R&D money has gone into this problem over the past couple of years, and the Epson Color IIs shows a massive improvement when compared to some of the early models. The problem has not disappeared altogether, however.

Another unfortunate characteristic of the el cheapo inkjet breed, is their tendency to be made up of flimsy plastic components. The Epson's output tray, for example, is made up of a thin plastic plate with an even thinner extension leaf, while at the top of the printer there's a frail blue lever for adjusting the paper thickness.

On the plus side, this printer scored well on output quality, producing its best results at 720 x 720dpi on high-quality, glossy paper. Photographic images were impressive with accurate, clear, colour reproduction helped by a high degree of control in the driver software. But this high output quality must be balanced against the printing time. Epson claims a modest three minutes per page for colour output, but if you're printing full-page colour you can expect to wait for at least 20-40 minutes. This is typical of the breed, though.

Eleanor Turton-Hill

PCW *Verdict*

Good Points Generally good output quality (apart from composite black).
Bad Points Extremely slow.
Conclusion A reasonable deal for a street price of approximately £170, but not one of the best budget inkjets around.

Price £170 (plus VAT) expected street price
Contact Epson 0800 220546

SOFTWARE

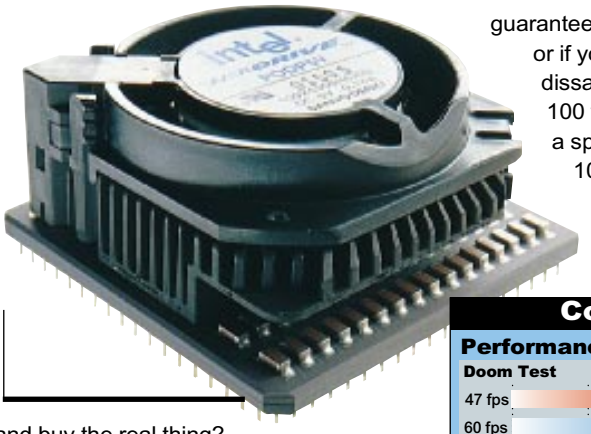
Intel Pentium 166MHz OverDrive

Use this new OverDrive chip to transform your tired old Pentium 100 into a faster model.

Here come Intel's Pentium-to-faster-Pentium OverDrive chips. We've already tested the 60 or 66MHz to 120 or 133MHz, 75 to 125MHz and 90 to 150MHz models. Now it's the turn of the 100 to 166MHz, although owners of 120 and 133MHz Pentiums will be relieved to discover that 180 and 200MHz OverDrives are on the way.

The whole idea of the OverDrive chips is to make a simple processor swap and restart your PC without any other changes. In most cases you won't need to adjust motherboard jumper settings, and all the OverDrive chips come with heat sinks and fans already fitted, all packed in a retail-friendly box.

The 60 and 66MHz versions feature a built-in 5V to 3.3V converter to work with older boards, and end up slightly slower than a genuine 120 or 133MHz Pentium. The 75, 90 and 100MHz OverDrives are essentially repackaged 125, 150 and 166MHz Pentium chips, with identical performance. So why not save a few quid and buy the real thing?



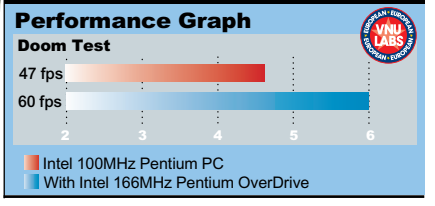
The first problem is finding someone to sell you a bare chip. Try mail order. Then you will have to buy and fit a heat sink and fan for around £20. Before powering up, you'll have to adjust the motherboard jumper settings for a faster chip.

Those who want the faster performance without the hassle should pay the extra 20 percent or so for an OverDrive. Unlike a bare chip it's guaranteed, with a refund if it breaks or if you're immediately dissatisfied. We dropped the 100 to 166MHz OverDrive into a space vacated by a Pentium 100 chip, and it gave a performance to match a typical 166MHz PC.

Gordon Laing

Comparative

Performance Graph



PCW *Verdict*

Good Points Simple speed upgrade.
Bad Points Bare chip cheaper.
Conclusion Hassle-free solution.

Price £475 (plus VAT)
Contact Intel 01793 431155

SOFTWARE

FrontPage 1.1

Microsoft does the business with FrontPage in the Office.

The second phase in Microsoft's attempt to dominate the Internet market has begun with the arrival of FrontPage, now officially part of the Office group of products.

Initially, it's confusing as to what FrontPage actually is. It's not just a simple HTML editor, but a complete Web-site package aimed at small-to-medium businesses, complete with a fully-functioning Web server.

Installation is extremely simple, and thanks to those ubiquitous wizards you don't have to worry about configuring the server. FrontPage asks for a server administrator's name (that's you) and password. There is no getting around this, and it makes sense to restrict access to the server. That's about as far as security goes, but you can change the password and set up proxy servers. You will need a 486 or better, Windows 95 (or Windows NT Workstation version 3.51) and preferably 16Mb of RAM and around 15Mb of disk space.

The other two parts of FrontPage are Explorer and Editor. Explorer is a mapping utility which you can use to analyse the state of your Web site with structure details and broken links. As far as mapping tools go, it's clear and simple. Double clicking on a HTML page will launch Editor, where you can make changes to the page or pages.

Pages are stored in what Microsoft confusingly calls "webs". A web is your home page (the index.htm file) and any linked pages, files or images that reside in the server's root directory. This is a complete server package. FrontPage steers you to creating an index.htm file as the starting point for your Web site. Once this is done you can continue creating further Web pages.

A neat feature of Editor is the ability to open any page from the Web, import it and save it to your site. Ethically, this is probably wrong but if there is a site you like you can use it as a template and insert your own text and graphics. Any HTML junkie will tell you this is a great way to learn. But FrontPage does its best to hide HTML from you.

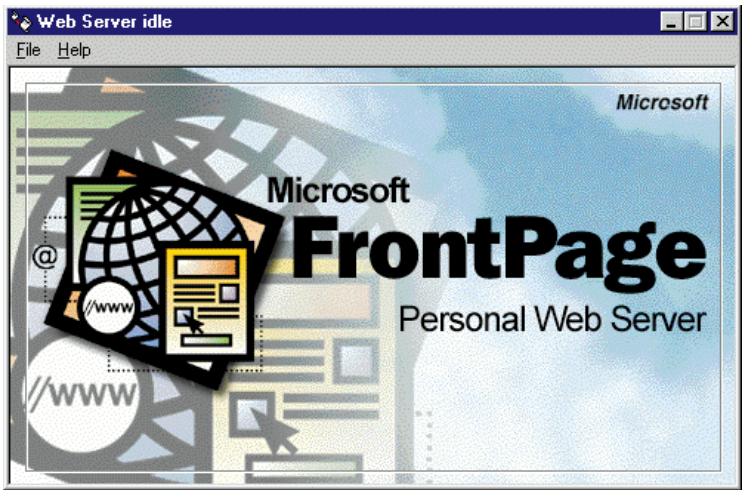
For example, inserting special characters is made easy by clicking and choosing them from a template. A number of "bots" automate tasks such as inserting a table of contents or a timestamp. And like most current HTML editors, tables (including nested) and field creation is fully automated.

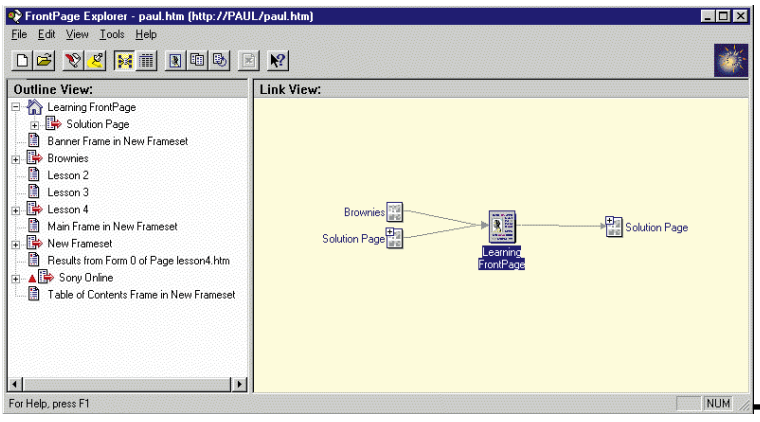
FrontPage claims to make designing pages with frames easy. It isn't. There is a Frame wizard but this will only build individual frames which you must link together at a later date. Nor do you get a WYSIWYG preview of frames in Editor. In the end I gave up trying to build frames. It's also annoying that you have to launch a separate browser to preview pages. It should be built-in.

FrontPage 1.1 integrates with other MS Office documents if they are held in the Web. It automatically launches the appropriate Office application from within the FrontPage Explorer. Once the document is updated, FrontPage automatically returns it to the Web. This is useful for Excel databases that may be accessed from your Web site.

Apart from the confusing terminology and frames integration, Microsoft has done a good job of making Vermeer's powerful product far easier to use.

PJ Fisher





FrontPage is now much easier to use, and will help you sort your "webs" from your "bots"...

PCW *Verdict*

Good Points Robust server. Good value. Well integrated.

Bad Points Silly terminology. Confusing frame design. No built-in preview browser.

Conclusion Web-conscious businesses will find more than enough in FrontPage.

Price £99

Contact Microsoft 0345 002000

SOFTWARE

Danmere Backer

If you keep backing out of doing backups, try this new solution from Danmere.

If you can remember the days of Sinclair ZX80s and Tandy 100s, you'll be familiar with the trials and tribulations of trying to record your great big 3Kb programs onto a cassette deck.

Now UK developer Danmere has come up with Backer, a modern-day version, for putting a complete hard disk backup onto video tape. With its long playing time and ability to pack data exceedingly densely onto the tape's surface, your domestic video makes a good data storage unit. The other advantage is that you've probably already got one.

Backer comes as a short ISA card plus a single software disk. Installation is relatively straightforward although a little old-fashioned. You have to sort out DMA conflicts by changing jumpers on the card itself, and if you want to change things like the size of the system's buffering, you have to get into the system.ini file and manually rewrite lines. It also uses DMA channel 1, which may well already be used by your sound card, so you'll have to change that too, but Backer does give you a short program which checks the card is installed and working okay.

Once installed, you connect the Video In and Video Out of your VCR to the phono sockets at the rear of the Backer card. Preferably you should have a TV connected to the VCR so you can double-check that data is going into the VCR correctly. A more convenient video system to do your backing up on is a camcorder. It's portable, you can easily set it up next to your PC, and it has a built-in TV monitor.

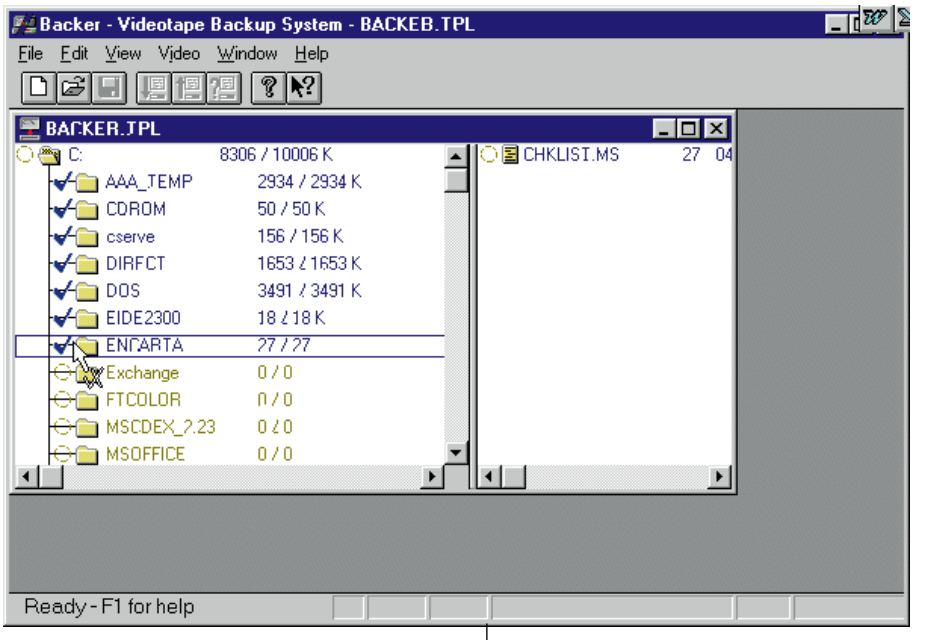
Files to be backed up are selected in a File Manager-type window, where you can select individual files, directories or complete disks. Then it is a small matter of putting the VCR into record and off you go, watching the data dance on your TV screen. Backer processes the files and sends them off to the VCR as a backup file with a save log that indexes the relative positions of each file stored on the video tape.

You can send either raw or compressed data to your VCR. Since the data processing and compressing is done by your PC's CPU, how fast it can compress and transfer data does depend on the speed of your PC. If you have a fast 486 or Pentium, then the compression allows you to write files at around 150Kb/s, but if you have a slower machine, a 386 or a slow 486SX, then that rate is effectively halved. If you want to cut down on the transfer time with a slow PC, then you can always ZIP the files first to reduce their size and therefore the amount of time it takes to record them onto tape.

Backer is not exactly fast. Backing up can be done as a background operation while you are working, but it is probably easier just to set the system up in the evening and let it get on with it. A couple of hours should see a 650Mb disk fully backed up.

There is a level of error correction added to the data, so that minor tape drop-outs don't cause problems, although it's highly recommended that you use new, good quality tapes for your archives and clean the tape heads before doing any transfer of data to or from the VCR.

You reverse the operation for a full restore from VHS to hard disk, or you can also use the file reference number and tape progress bar to find and reload selected files. This requires a lot of use of the VCR's fast forward button, just like looking for an elusive TV programme.



With Backer, your video recorder could have a second career as an occasional backup device

Does it work? Definitely. Is it convenient? There's the rub. First, you'll need to take your PC to the VCR/TV set-up or vice versa. It is slow, and you need some understanding of the complexities of setting up DMAs, and finding individual files really does take you back to those ZX80 days.

Is it cheap? At under £40 you can't get a cheaper backup system to keep safety copies of your hard disk, and it beats the hell out of trying to manually back up onto a couple of hundred floppy disks.

Tim Frost

PCW *Verdict*

Good Points Very cheap, and it works.

Bad Points Scores low in convenience terms.

Conclusion At under £40 Backer is worth investing in, if only just to make the occasional complete safety copies of your hard disk. For everyday use, it's not really on.

Price £39.95

Contact Danmere 01606 74330

HARDWARE

Canon MP10

Canon pins its hopes on its MP10 to be the ultimate all-in-one solution.

Printer/fax/scanner/copier. Based on Bubble Jet technology, Canon's MP10 does it all and has a powerful desktop management system, too

Suddenly everyone's making them, and every small or home office (SOHO) wants one. I'm talking about all-in-one printer/fax/scanner/copiers.

Canon's latest is the MP10. It's a smaller, cheaper and neater machine than Canon's first stab at this market, the B360, although it has an identical fascia and most of the same features. It's smaller than most of the opposition, too, with a footprint measuring just 360 x 165mm. The paper feed tray for faxing and scanning takes 20 sheets and sits on top of the paper tray itself. Printouts emerge face-up from the front of the printer.

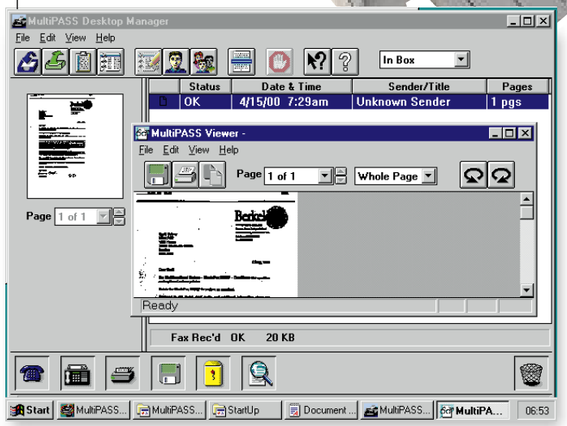
Unsurprisingly, the technology used is Canon's proven Bubble Jet. It prints at 360dpi onto plain paper, which costs less and lasts longer than the thermal paper used by older fax machines. It connects to a PC using a fast bi-centronics-enhanced parallel interface, which means no serial cable is required. It also has an energy save standby mode which activates after five minutes of inactivity and cuts energy consumption to just 0.9W.

To make a copy you place the sheet, or sheets, face down on the feed tray and press the start button. For a typical business letter with a letterhead, the page took just over 20 seconds to scan and the finished copy emerged after one minute 45 seconds.

Simple faxing works in an equally straightforward way. If you read the manual, you'll find "one-touch speed-dialing" which lets you assign common fax numbers to one button, and "directory dialing" which lets you select numbers you've recorded by their initial letters and acts as a mini address book. You can also use the delayed sending feature to take advantage of off-peak call rates.

So far not so different from Xerox and H-P's offerings. But this kind of device stands or falls on its software. Canon's MultiPass Desktop Manager for Windows installs from two floppy disks and in the process offers you the chance to install the MP10 as the default printer.

The printer performed as expected and churned out respectable black-and-white output at bubblejet speeds. Monochrome is a slight disadvantage at a time when the most humble standalone inkjet printers now produce colour. It does have some special features of its own, though, not least the ink-saver option which prints out legible output using less ink. It's useful if you receive a lot of junk faxes.



The MultiPass Desktop Manager is a powerful bit of software. It manages incoming and outgoing faxes, but will also record information about voice calls you have made and includes a dialer. It handles scanning and lets you save scans in TIF, BMP, PCX or DCX formats, or you can scan straight into applications with TWAIN support. Scanning is black-and-white or greyscale only.

A series of function buttons across the top of the screen are used to move between different windows: the Address Book, the In-box, the Out-box, the Fax Log and the MultiPass viewer. The In-box lists scanned documents, saved faxes and received faxes. The Out-box does the same for documents waiting to be faxed or printed. The Fax Log lists the last two months' of fax activity. At the start of a new month the oldest is automatically deleted. The MultiPass viewer is used to display any document listed in the boxes or undeleted documents in the Fax Log.

The MultiPass software lets you fax documents from any Windows application that supports printing, using the MultiPass print driver. If preferred, you can create and send faxes straight from the MultiPass software. It's also easy to add a custom logo and signature to the supplied coversheet, of which there's only one, but with a choice of 12 languages. You can also use the address book to create fax groups or you can import existing fax numbers from any comma- or tab-separated ASCII file.

The Canon MP10 has masses of features. Few people will use them all. Everything is fully documented in the two manuals supplied, one of which is for the software and the other for the unit itself.

Ben Tisdall

PCW Verdict

Good Points All-in-one design saves space and money.
Bad Points Slow output. Scanning and printing are mono.
Conclusion I want one anyway.

Price £799 (plus VAT)
Contact Canon 0181 773 3173

SOFTWARE

VisualAge C++ 3.5 for Windows

Visual programming for Windows C++ developers.

IBM's VisualAge does real visual programming, conceptually beyond that which rivals such as Visual Basic, Delphi or Visual C++ can muster. Like other products, VisualAge allows a graphical interface to be painted with visual tools but goes further by letting you define program logic visually, as well.

VisualAge belongs to a far-reaching strategy based on "parts": objects with a standardised public interface which lets them interact with other parts. The idea is that parts should eventually be plug'n'play between applications, languages, operating systems and across networks.

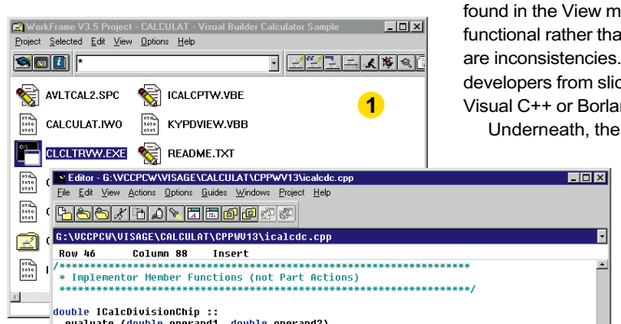
To achieve this, IBM's preferred route is the System Object Model (SOM). VisualAge C++ has a Direct-to-SOM feature that lets you create SOM objects easily. This gives VisualAge C++ for Windows a double significance. Windows is the leading desktop platform, C++ is the language of Windows, and its developers now have both true visual programming and a way in to developing SOM objects.

VisualAge includes technology from Taligent, which is the key to rapid and robust object-orientated application development. Taligent is now responsible for IBM's Open Class C++ library which is portable between OS/2, Windows, AIX (IBM's Unix operating system), Sun Solaris, and others. Taligent has built OLE support into Open Class, allowing easy implementation of OLE containers and servers. Open Class is the class library supplied with VisualAge, giving developers a cross-platform alternative to Microsoft's Foundation Classes or Borland's Object Windows Library.

But VisualAge is a product of great promise, only partially fulfilled. Would-be users face several problems. Most C++ products are greedy for system resources, but this is more so. Under Windows NT, 28Mb of RAM is the recommended minimum, or 24Mb for Windows 95. Some suggest 48Mb for serious work. You can install the tools to run from the CD, but you will not want to: tools are slow to load, even with a full installation to the hard disk.

From a Windows perspective, everything is horribly non-standard. Tabbed dialogues depict a crudely-drawn spiral-bound notebook. Online Help doesn't use the Windows help engine. Tooltips are called Hover Help. In the WorkFrame IDE, there is an Options menu but vital preferences are unexpectedly found in the View menu. Dialogues are functional rather than attractive and there are inconsistencies. This will not help win developers from slick tools like Microsoft's Visual C++ or Borland's Delphi.

Underneath, there is plenty to admire. Open Class is an excellent class library. The IDE is an efficient tool, once the interface quirks have been mastered. VisualAge C++ supports templates, run-time type information and multi-threaded programming, to name but three advanced features.



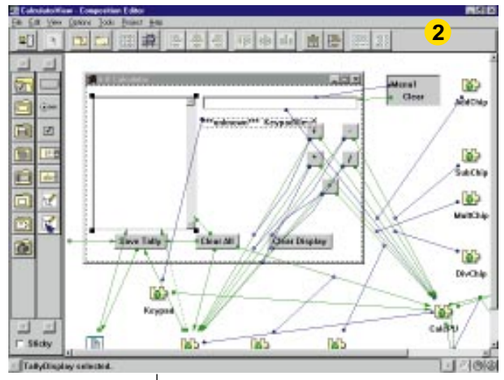


Fig 1 *The WorkFrame IDE shows project elements as icons, with folder icons indicating a sub-project such as a DLL. The editor is fully language-sensitive but slow to load*

Fig 2 *The visual builder lets you combine visual and non-visual objects by drawing connections and defining how they interact*

The Data Access Class Builder generates database classes based on the database and tables you select, with support for DB2 or, via ODBC, Sybase and Oracle. There is a wizard, called Project Smarts, which will create a wide range of skeleton applications, including DLLs, OLE applications and database programs. Best of all is the Visual Builder which simplifies the work of creating classes, reusing existing classes, and linking visual and non-visual parts to make an application.

But VisualAge is not yet the first choice for Windows development. A serious flaw is in the applications it creates, which load more slowly and have less snappy interfaces than its rivals. The tools themselves have this characteristic, which means slow development and poor performance from the final executable, too. Until IBM offers improved performance and a more polished interface, VisualAge will attract only those who need its special features.

Tim Anderson

PCW Verdict

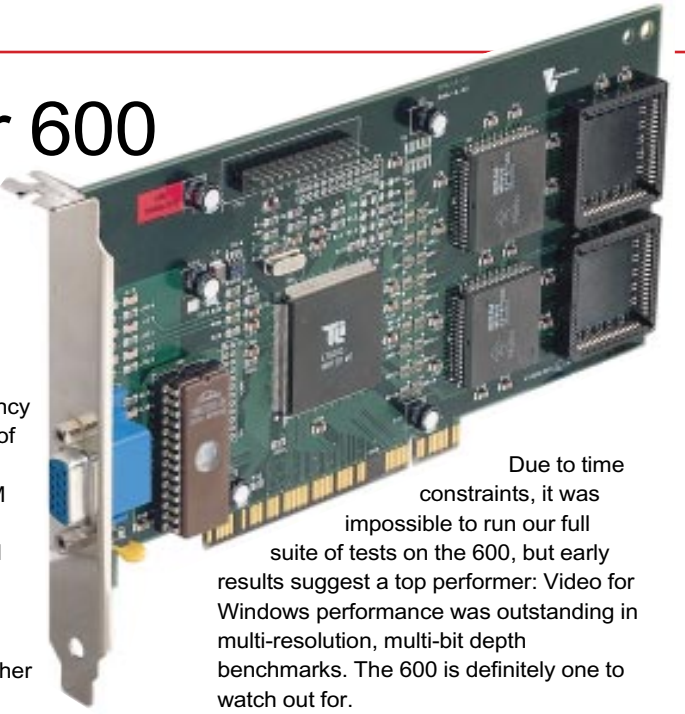
Good Points Real visual programming in C++. Cross platform support.
Bad points Clumsy interface. Big, slow and memory-hungry.
Conclusion Lots of great technology. Good for cross-platform development. Needs more work.

Price £311 (plus VAT) CD-ROM only; £338 (plus VAT) with documentation. Upgrade deals available.
Contact IBM 01256 343000

HARDWARE

Videologic Grafixstar 600

The Grafixstar is a real star; allegedly Videologic's fastest PCI card yet.



Aimed at Windows 95 users and games players, the GrafixStar 600 PCI card is the latest from multimedia pioneer, VideoLogic. Based around the Tseng Labs ET6000, it uses a revolutionary memory architecture, known as Multibank DRAM, which the company claims makes it the fastest card it's ever produced.

The ET6000 is a 128-bit graphics engine with advanced multimedia support, including bi-linear pixel interpolation. This improves picture quality when video is scaled up by smoothing out the jagged lines using anti-aliasing techniques. The chip supports resolutions up to 1,600 x1,200 pixels, and a top refresh rate of 120Hz.

Videologic has combined the processor with 2.25Mb of Multibank DRAM (MDRAM) — an enhanced version of traditional DRAM that splits the memory into multiple, small, internal banks. The designer, MoSys, claims the result is improved data throughput speed and efficiency. The system has a low memory latency and a peak bandwidth of 1Gb per second. By contrast, regular DRAM comes in at around 400Mb/sec, and VRAM 440Mb/sec, but these figures depend on the clock speed of the graphics processor. Either way, there is a marked difference in performance.

The Grafixstar 600 comes with DirectDraw-compliant drivers for Windows 95, and VideoLogic's SmartTools setup program. A suite of simple but easy-to-use image editing and video editing software is also bundled. Software installation went smoothly, except DirectDraw had to be installed manually.

Due to time constraints, it was impossible to run our full suite of tests on the 600, but early results suggest a top performer: Video for Windows performance was outstanding in multi-resolution, multi-bit depth benchmarks. The 600 is definitely one to watch out for.

Chris Cain

PCW *Verdict*

Good Points Excellent video acceleration. DirectDraw drivers. Cheap
Bad Points No DirectDraw applications available yet.
Conclusion Potentially excellent.

Price £169 (plus VAT); £150 street (plus VAT)
Contact VideoLogic 01923 260511

HARDWARE

Reveal WAVExtreme 32 PnP

A new and improved plug-and-play soundcard.

WAVextreme 32: a clean, compatible, high-quality soundcard

Reveal's WAVExtreme 32 is based on AMD's new InterWave audio processor. In a nutshell that's a single, low-cost, chip that provides high-end digital audio along with 127 GM-compatible WaveTable instruments. On paper it looks slightly better than the AWE-32. It has 1Mb of samples, but has professional 48KHz duplex sampling capabilities, enabling you to record and play back digital audio simultaneously.

There are two cards in the current range. The WAVExtreme 32 Pro version offers additional digital effects and the ability to download samples to 512K of on-board RAM. This can be expanded to 16Mb using standard 72-pin SIMMs.

Both cards are plug-and-play, making installation easy. Out of curiosity, I installed the card alongside an AWE-32 and was a tad surprised when it actually worked. After several Windows 95 restarts, both cards were playing together, which made it easy to compare them. The most noticeable difference is that the WAVExtreme has a better signal-to-noise ratio — that's less hiss, to you and me. There's little to set the WaveTable instruments apart, although the output from the WAVExtreme had more depth.

The software bundle is less than exciting. There's a standard utility for playing CD audio, MIDI and wave files, a basic MIDI sequencer and a talking calendar that allows you to record and play back voice messages. On a more positive note, the card is compatible with every sound standard you're likely to come across, from ad-lib through to GS, an extension of General MIDI.

Steve Helstrip

PCW *Verdict*

Good Points Clean, high-quality output.
Bad Points Poor software bundle.
Conclusion The best card under £100.

Price £79 (incl. VAT); Pro version £99 (incl. VAT).
Contact Reveal 0181 845 7400

SOFTWARE

Corel Visual CADD

A new contender in the 2D computer-aided design battle.

Corel used to be a one-product company. In the last five years, it has branched out into everything from word processing to Home titles. Now it's the turn of computer aided design. This is the third release of Visual CADD.

This version is a 32-bit application which is fully compatible with Microsoft Office and needs Windows 95 or NT. Corel has resisted the temptation to stamp its own interface onto the product, so it remains with a top Speedbar containing the usual file, print, clipboard and undo buttons as well as layer, line and zoom controls. On the left of the screen are the drawing tools, arranged in Flyouts so you get, for example, the choice of single-segment, continuous or double lines.

A strange and irksome oversight in previous versions was that although you could load multiple files, you couldn't have multiple views of the same drawing. This has now been rectified, and you also get a small bird's eye window to zoom or pan the current view.

The status bar is interactive. You can change units of measurement and choose whether you want to work in co-ordinates "absolute" to the sheet, or "relative" to the last point entered. If you want to enter co-ordinates via the keyboard then you just type away. You don't have to click on, or tab to, an entry box and mathematical expressions are automatically calculated. You can take this a step further by using keyboard shortcuts for commands. For instance, "li 25,25 <return> 50,50" will draw a straight line between those X-Y points. The two-letter codes appear on the status bar and on ToolTips even when working with the mouse, providing a fairly painless learning curve.

The right mouse button produces a well-designed context-sensitive menu, and the Speedbar also changes to let you alter settings such as line type and thickness. A clever touch is the Match button which lets you "pick up" the attributes of one object, such as line colour and thickness, and draw new objects with those attributes. Another good drawing aid is the "ortho" implementation. This constrains the cursor to 90 degree movement, but you can change the base angle to draw 30 degrees and 120 degrees to the paper rather than just the usual 0 and 90.

There's a good selection of trimming, chamfering, offsetting and multiple copy commands, and a "tracking" command that lets you draw lines that vanish. This might sound bizarre, but is extremely useful in positioning objects relative to each other. You don't have to go back and erase construction lines.

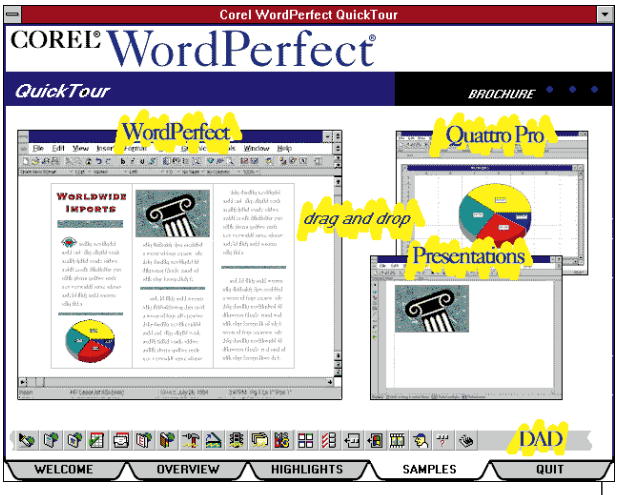
Visual CADD's really strong point is its customisability. Although you have to edit text files to customise the menus and button bars, you can go much further than just altering the interface. Scripts can be used to automate procedures and the program's open architecture means that third-party developers can create custom add-ons in languages such as C++, Visual Basic or Delphi. There's a 500Kb help file on the application programming interface (API) commands.

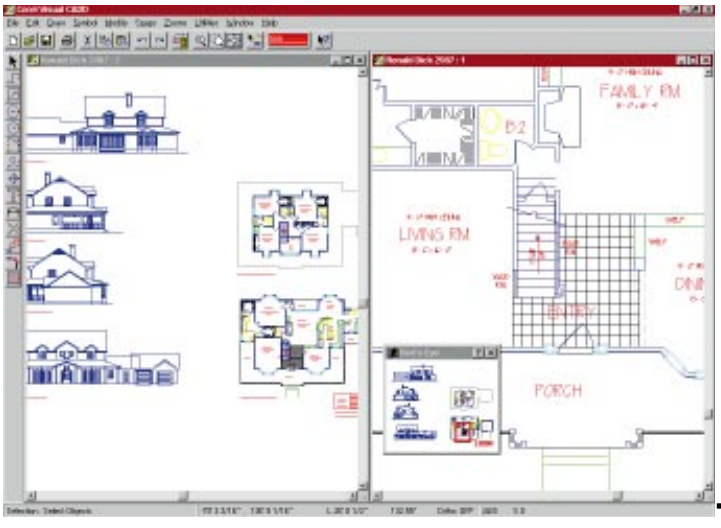
Another advanced feature is the use of Reference Frames. You can place a non-editable copy of a drawing into another drawing, combining several different files and scales in one print-out.

Office compatibility has brought new style-tabbed dialogue boxes as well as three rather lame wizards for setting up text and dimension sizes. Bundled with the software is a catalogue of house plans. This doesn't really add much value for UK users as they're all North American in style, and consist of simple plan and elevation views, with the full set of drawings costing several hundred dollars per house.

There are also extensive libraries of mechanical electrical and architectural symbols, but again these use US conventions and imperial measurements. Visual CADD is meant as a competitor to AutoCAD LT, and although it has, in my opinion, a far more stylish and friendly interface, and is cheaper, it lacks the latter's (albeit limited) 3-D capabilities.

Tim Nott





Above *Office-style tabbed dialogues in this Windows 95 version*

Left *Multiple views on the same drawing*

PCW *Verdict*

Good Points Excellent interface and open architecture for third-party add-ons.

Bad Points 2D only. Libraries and house plans not UK localised.

Conclusion A serious CAD all-rounder for 2D work.

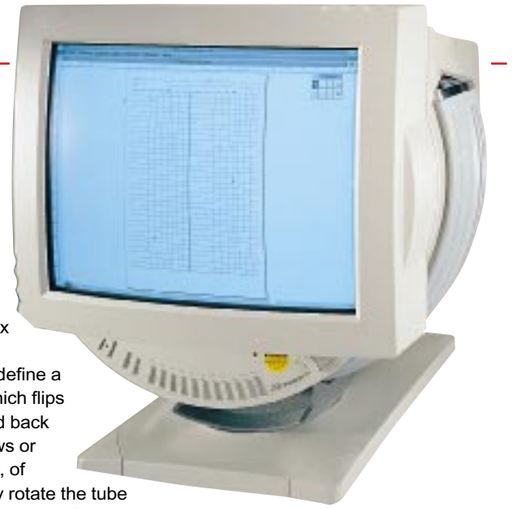
Price £349 (plus VAT)

Contact Channel Market Makers 01703 814142

HARDWARE

ADI MicroScan 17X

If you wish you could view A4 documents full-size, this 17in rotating monitor could be the solution.



Many users frequently work on portrait-shaped documents, yet view and edit them shrunk down on landscape-shaped monitors. Why not have the best of both worlds with a monitor which can actually rotate through 90 degrees from landscape to portrait and back again as desired?

Radius got there first, years ago, and now ADI is having a go. It makes complete sense when you consider that a relatively cheap 17in monitor rotated through 90 degrees can display an A4 document full-size. To do this on a fixed landscape monitor would require a large and costly 21in model. ADI's MicroScan 17X comes in at a reasonable £699 (plus VAT) on the street.

Unlike some earlier rotating monitors, ADI's 17X doesn't require a proprietary video card. The supplied Windows 3.x and 95 drivers will work with most popular models, although check with ADI before you buy. We tried it successfully under Windows 95 with a Matrox Millenium.

The Windows drivers define a keyboard combination which flips the display on its side and back without restarting Windows or any applications. You will, of course, want to physically rotate the tube to match, although this is where ADI has missed a couple of opportunities. The mechanism is crying out for a locating and locking click when rotated to its limits. This could be tied in with automatic degaussing, which must currently be performed manually after each rotation.

This said, the 17X is physically great and does what it says. It'll display its maximum 1,024 x 768 resolution non-interlaced at 75Hz comfortably, if a tad softly. The 17X is what a lot of users have been waiting for, although be aware that flipping is for Windows only. Full-screen DOS stays in landscape orientation.

Gordon Laing

PCW *Verdict*

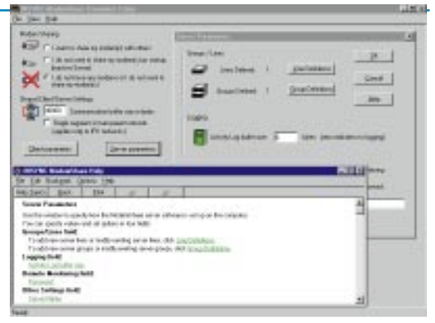
Good Points View full size A4 cheaply.
Bad Points Missed some design opportunities.
Conclusion Could save you buying a 21in.

Price £699 (plus VAT)
Contact ADI Systems UK 0181 236 0801

SOFTWARE

Artisoft ModemShare

If you can't see for cables in your office, try the cost-effective ModemShare.



Relief from network headaches provided by well-constructed help files

ModemShare, as its name suggests, allows modems to be shared across a local area network. Although larger companies are moving towards ISDN and leased lines, there are a lot of smaller companies that rely on modems for internet and email access. ModemShare drastically reduces the number of modems and telephone lines required. Many small offices or workgroups will be able to get away with just one.

We installed the Win95 version, but there are also DOS and Win 3.x versions supplied in the same box. The only bits of semi-technical information you need to know for installation are what type of network you're using, and to which port the modem is attached. You then install the software on a workstation equipped with a modem, as a modem-server, and on other workstations as clients. The server and all workstations can then access the same modem.

In the *PCW* office we soon found a use for it. Although we have a leased line connection to the Internet, it's currently impossible to access Compuserve using it. ModemShare neatly fills the gap.

The well put-together help files with their excellent trouble-shooting section came in handy when resolving any network headaches. There's also a 230-page manual containing details of the more advanced features. For example, you can set up a dedicated ModemShare server with several modems installed. With the Windows versions of ModemShare, there are options for modem request queuing or automatic re-trying when the modem becomes free.

ModemShare also lets you dial into a network from outside. This means it will work with another Artisoft product, Cosession Remote. From a modem at home or on a remote site, it's possible to dial in to the modem server and access your own PC across the network.

Ben Tisdall

PCW *Verdict*

Good Points Easy to install and use.
Bad Points None to speak of.
Conclusion A neat product that will quickly pay for itself.

Price £89 (plus VAT) for one-port version.
Contact Artisoft 01753 842200
http://www.artisoft.com

SOFTWARE

OmniPage Pro 7.0 (for Windows 95)

The updated and altered OCR package.

OmniPage is an Optical Character Recognition (OCR) package, a program which turns printed pages into text documents that can be imported into word processors, spreadsheets and so on. Omnipage has always been one of the more expensive packages, but also provides the richest set of features.

An AutoOCR button does everything for you with a single mouse-click. It scans the page, selects zones, and carries out the recognition. Or you can switch to the OCR Wizard to guide you through the scanning process and the options you may need to set.

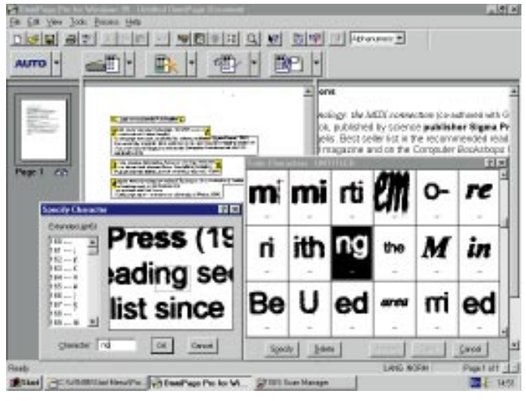
Once recognition is complete, you can correct all words/characters that were not scanned clearly, or are not in the dictionary. The process is much like using a spelling checker, but the suggested alternatives here have been adapted specifically for OCR errors. These are a special kind, being mostly look-alikes. The closest to "Best" might be "8est", "Beat" or "Beet". The suggested alternatives in OmniPage are well chosen.

There are many options related to improving the OCR accuracy process itself, including Dot-matrix, OCR-A-Font and 3-D OCR (works with greyscale images). OmniPage uses H-P Accupage 2.0 technology to improve character recognition on coloured or shaded documents and includes a training mode.

OmniPage can keep the original page layout and is very good in this respect. A True Page option lets you retain a document's images, tables, columns, paragraph style and font. It can even match combinations of serif and sans serif, and monospace and proportional, to four fonts of your choice.

The program will automatically correct page orientation. Although there are tools to rotate scanned images, there's no facility to handle skewed images. Some of OmniPage's competitors such as TypeReader and WordScan will do this. We are told that this feature will be available in the next version of Omnipage, expected early next year.

There's standard support for character sets in 13 Western European languages. The US version of the software does not include dictionaries for these languages, but we are told the European English version does. You need these dictionaries if you're going in for multilingual texts, and if you want to get the best out of this program because OmniPage uses a special technique called Language Assistant to improve recognition. It looks at a word as a whole rather than just as separate characters.



Above *The screen is split into three main windows: thumbnails of the scanned pages; the scanned image and the areas marked to be recognised; and the recognised text. A Language Analyst helps to Check Recognition*

Left *Omnipage is one of few OCR programs offering a character training mode.*

About 100 scanner models are supported, including the well-known brands. A scan manager utility lets you change scanners after program installation, and it's flexible and extensive in its scanning options.

There's a choice of more than 20 output file formats as well as some specific ones used by mainstream word processors, spreadsheets, presentation packages, and dBase.

As for graphics, it's not often that a newer version of a program does away with useful features, but this latest version of Omnipage no longer includes Image Assistant, the 24-bit graphics editing utility: we have been told that users wanted to be able to use their existing graphics package instead.

The program now integrates directly with the following image editors: Adobe Photoshop (and LE), Corel (Draw and PhotoPaint), Micrografx (PhotoMagic, Picture Publisher and Draw) and Windows Paint.

There are many additions and improvements in this new version, such as email support via MS Exchange and other MAPI-compliant email systems. You also get HTML publishing and OLE 2.0, Thumbnail View, OCR Aware and scheduling of OCR jobs at any time of the day.

Apart from the full OmniPage, a cut-down version of the product is also bundled with quite a few scanners. The cost to upgrade to the full version is only £129.

Panicos Georghiades and Gabriel Jacobs

PCW *Verdict*

Good Points Usability. Multi-lingual support. Integration with other programs. Accuracy.
Bad Points Speed.
Conclusion The majority of improvements are related to making the product easier and faster to use. Excellent integration with other applications.

Price Street price £400 (plus VAT)
Contact Caere UK 0171 222 3200

PCW How You Can Contribute To The Long Term Tests Section

We welcome contributions from readers for our Long Term Tests section. If you've been using a piece of hardware or software intensively for some time, just write a 450-word article (for hardware) or a 750-word piece with screenshot — GIF format — for software and send it on disk, in MS Word (Mac or PC) or ASCII format, to: Adele Dyer, Personal Computer World, VNU House, 32-34 Broadwick Street, London W1A 2HG. Mark your envelope clearly "Long Term Tests". Or email it to adele@cix.compulink.co.uk. We'll pay for any contributions we use.

HARDWARE

Syquest EZ135 Parallel Port model

3 MONTH TEST

This Syquest drive offers quick storage and peace of mind, but installation caused a few headaches.

FOR MANY YEARS I HAVE RELIED on floppy disks for backing up. I may have just been lucky, but I never had any problems until about three months ago. I loaded some Internet software from my new service provider and it had a great time, renaming both my win.ini and progman.ini files, and a few other Windows files as well. This caused some headaches for a day or two until I worked out what had happened. I decided my first priority from then on would be a quick and easy backup system.

As I already had two floppy drives, two hard disks and a CD-ROM drive, there wasn't much empty space left inside my Evesham Vale minitower, so I decided on a Parallel Port Syquest EZ135 drive.

The drive is a solid, dark grey, plastic box weighing 1kg. Measuring 21cm x 12cm x 5cm, it has a disk cartridge slot, a lever to load and unload the drive, a power-down button, two LEDs and an emergency eject hole on the front. It has a pass-through port for a printer, a socket to connect the separate power supply, and an on/off switch on the back. All the necessary cables are supplied, and it can be used vertically or horizontally. Installation floppies are provided for DOS, Windows 3.1, Windows 95, Windows NT and OS/2.

I have two complaints, one of which is with the installation routine. I followed the instructions, choosing the express installation, only to find my new Syquest had called itself drive D, and that my D:, E: and F: drives were no more. I tried the custom install but again, was not asked to choose a drive. It took a while to find the instructions in small print on the back page, directing me to the manual on the Windows 95 driver disk. These explained how to christen my new drive "G". It is plug-and-play with Windows 95.

The drive functions perfectly and my printer works as before on the pass-through port. My only other gripe is that the load/unload lever does not always totally disengage, which makes it difficult to remove the cartridge. I hope this will improve with wear.

Data transfer times are about 120Kb per second with Microsoft Back-up using compression on a 486DX/66. Each cartridge holds 129Mb formatted. Priced at around £15 plus VAT, this means the cost is about 13 pence per megabyte. I have 700Mb of programs and data backed up on three cartridges (compressed 2:1) and now have peace of mind. I no longer have to worry about larger hard disks, and I can transport large amounts of data between distant computers, if the need arises.

David De Burgh

The Syquest EZ135 is ideal for data storage and transport

PCW Verdict

Good Points Plenty of capacity.
Bad Points Tricky installation.
Conclusion Cheap storage.

Price £199 (plus VAT). Cartridges from £13 to £18, depending on supplier
Contact Syquest 0800 526559

SOFTWARE

Coda Finale version 3

18 MONTH TEST

Finale can help you score some magnificent musical goals — but only if you persevere. It's not the friendliest of packages.

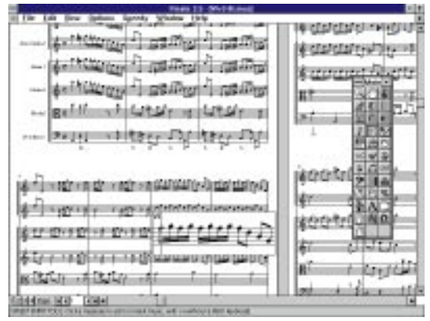
MUSIC DTP IS INHERENTLY MORE complex than text-based DTP. There are more characters in standard use and the precise alignment of the various symbols, both horizontally and vertically, is critical.

Finale first gained a reputation with version 2. It was supposed to be a usable application with a very steep learning curve. However, most users, except the most technically adept musicians, found it insufficiently instinctive for creative use. For example, I was trying to lay out a fairly complex guitar piece and at one point had to complete it "by hand", using the music fonts in CorelDraw.

With Finale 2, there were printing problems unless the laser printer was set up as a dedicated machine. Obtaining bureau bromides was a nightmare and even configuring for basic sound was complex. Perhaps Finale 2 was a good example of a respected Mac application, making a rather uncomfortable transition to the PC.

About 18 months ago, Finale version 3 was launched. Having paid nearly £700 for version 2, I was reluctant to consider even the "low-cost" upgrade, but eventually curiosity got the better of my wallet. Version 3 is a substantial rewrite and, on a mid-range PC, it works at an adequate speed and can be used in a genuinely creative way.

The package comes on two floppy disks and requires three substantial manuals, so it is still not as user-friendly as many modern DTP programs. The first manual contains a clear sequence of tutorials which, when worked through carefully, cover the most obvious requirements. A few hours of personal tuition would help ease beginners through the apparent complexities. The second manual looks at topics from a musical angle, while the third covers the same ground from a hardware point of view. If you get stuck, there should be a solution whatever the problem.

The on-screen help is comprehensive, but often seems to start at a level too advanced for first-timers. For example, it tells you precisely how a dialogue box works, but not how to find that dialogue box in the first place. Finale is full of dialogue boxes, which are going out of fashion elsewhere. Need there have been quite so many "nested" boxes? A simple clef change requires two boxes, and the Shape Creator about a dozen.

Finale generally hits the right notes, but the learning curve is steep and there are rather too many dialogue boxes

Finale 3 introduced TrueType support and the PostScript RIP has been upgraded, so printing is now straightforward. However, it is impossible to alter the printer configuration from TT to PS within the program. For a busy composer or arranger, the printing capabilities are a real boon. From the full score, different parts can be extracted and edited independently, with automatic transpositions as required. When working against tight deadlines, the instrumental parts can be printed straight from the full score.

Another highly productive innovation is the Hyperscribe tool, which enables the user to enter the pitch, rhythm, dynamics and articulation directly from a MIDI keyboard. The music then appears on-screen in accurate music notation. Hyperscribe takes a little getting used to, but is well worth the effort. Of course, it is still possible to enter the notes direct from the qwerty keyboard and then edit them.

Music is first entered in Scroll view (one continuous horizontal music system) and then laid out in Page view. Page layout can be infuriating. For once, it would be best to have an automatic dialogue box to set out, for instance, three staves per page, 1cm apart. Instead, the process is basically interactive, and a small adjustment to one stave can affect the whole score. At best, the result is of professional quality, but as with any DTP package, the final appearance depends partly on the artistic skill of the operator.

Once the score has been notated and laid out, the next stage is to make it sound right. This is, of course, another significant process which has no parallel in text-based programs. Appropriately, Finale 3 offers excellent MIDI support. Passages can be played back as required, while the whole piece can be stored as a playback file and performed as the notation scrolls along. The on-screen controls function like a tape deck. It is possible to give the performance a less synthetic quality by adjusting the "feel". Alternatively, selected notes or passages can be modified individually. No current synthesiser will sound completely realistic, but Finale makes a bold attempt.

One or two minor quibbles, particularly over page layout, have been addressed in version 3.5 (released towards the end of 1995). Version 3.5 also increases automation on slurs, enhancing the consistency of the layout. Plus, it facilitates the notation of proper percussion parts, and includes a special percussion font.

Finale is capable of doing an excellent job. It can publish virtually any conventional or experimental score, and can really help in the more laborious stages of composing.

Mark Ellis

PCW Verdict

Good Points Excellent MIDI support.
Bad Points Involves a steep learning curve.
Conclusion Can publish almost any score. Helps with the laborious stages of composing.

Price £699 for Finale 3.5
Contact MCM 0171 723 7221

Once more unto the breach

Those old warhorses of the chip world, Intel and Cyrix, do battle again as the Pentium reaches 200MHz and Cyrix aims to compete. As a guide to the outcome, Adele Dyer pits nine PCs against each other in an intriguing head-to-head.

Intel and Cyrix have been gunning for one another in a big way over the last few months. The first M1, Cyrix's prototype Pentium challenger, appeared in the new year. Since then, Cyrix has brought out a whole range of processors rated according to their relative performance against the Pentium, hence the P200+ name.

Intel has souped up its PCI chipsets and so has Cyrix. Intel has new boards, so has Cyrix. But still the Cyrix chips were said to be outpacing the Intels. The Cyrix chips were still in very short supply at the time of writing and there were problems with the pre-production motherboards, so we have eight Intel machines and only one with a Cyrix processor. The latter is very much a pre-production machine. However, we put the machines and the claims to the test and produced some interesting results.

Armari

Armari

Of all the boards we saw with the 200MHz Pentium, the Tyan Tomcat2 in the Armari was the one best suited to the chipset. The board uses the 430HX chipset; this supports large memory arrays, so the board comes complete with a whopping eight SIMM slots. 32Mb of EDO RAM has been put into two of these. Not content with Intel's claim that the HX chipset makes cacheless systems possible, Armari has installed 512Kb of pipleine burst cache. The hard disk is only a 1.2Gb Quantum, but the performance was comparable to Pentium 200s with larger hard disks. The board also supports USB.

The other components are of a good standard. The graphics card is a Matrox Millenium, the soundcard a Creative Labs AWE-32 and the CD-ROM drive a six-speed TEAC. Armari has kept fuss to a minimum and has offered a solid machine with plenty of room for expansion.

The results showed the Armari's performance to be extremely good for this configuration. With a smaller hard disk than any of the other machines, we were expecting it to be an average performer; what we didn't expect was for it to speed away in quite the way it did. The graphics-intensive Doom and Corel tests gave results par for the course from a machine with the Matrox Millenium card.

The monitor is the peerless Iiyama VisionMaster Pro 17, an excellent choice: sharp, free from flicker and moiré, with a pleasant surround and good on-screen controls.

AST

AST has stuck solidly to the business route with this machine. The company has chosen the 430HX chipset opimised for 32-bit packages, network and video conferencing applications. The board is the new Intel Rhinestone, which includes six SIMMs and a USB connection. The HX chipset is optimised to work with EDO, not SDRAM.

The board takes care of the video and sound with an excellent ATI Mach 64 chip and a Vibra 16s chip. There is a connection on the motherboard for extra video memory, while all five ISA and two PCI slots are on a riser card. The case gives you plenty of bays for expansion — three internal 3.5in bays and two free front-facing bays.

Performance was solid on all three tests, It had the highest Corel score of the Pentiums, partly due to the quality of the video chip. The office application tests gave a respectable 2.38.

The 17in monitor was aesthetically pleasing and had good controls, but it suffered from moiré even at 800 x 600 and had slight flicker. The colours were deep, but their definition wasn't perfect.

Carrera

Carrera had the option of supplying us with a Cyrix machine, but due to problems with the motherboard, was unhappy with its performace using IDE devices. Instead, the company opted to show us an Intel machine. Carrera will wait to produce a Cyrix equivalent until some of the other motherboard manufacturers can supply a 75MHz board and a chipset which better supports IDE.

This machine was specced very much like the Armari. It had a 1.2Gb Quantum Fireball, 32Mb of EDO RAM and 512Kb of pipeline burst cache. Carrera has chosen the HX chipset and firmly maintains that it is far superior to the VX in performance; and, of course, it is optimised for 32-bit, plus it supports USB which counts heavily in its favour.

On the tests, it came up with the best Doom score of all the machines, although only by a whisker. The Corel test was as one would expect from the Matrox Millemium card, but the office application tests were less impressive.

Included in the deal are a Creative Labs AWE-32 sound card, TEAC six-speed CD-ROM drive (by far the best six-speed drive around), and an Iiyama VisionMaster 17in monitor.

Dan

Dan has kept to its usual motherboard supplier, Asustek. This board has been fitted with the 430HX chipset, but does not have a USB connection. All four SIMMs slots were taken, with a total of 32Mb of EDO RAM. The effect on performance was staggering, as it positively sped through our office application benchmarks. The 512Kb of pipeline burst L2 cache will also have made a difference on these tests. The Doom and Corel tests were the same as, or better than, many of the machines that used a Matrox Millenium video card.

Instead of the usual CD-ROM drive, Dan has added a Panasonic PD drive — an optional extra on all its machines. It gives you a quad-speed CD drive and tape backup on 650Mb disks all in one drive. Also included are a 28.8 internal fax modem and an AWE-32 sound card with an extra 512Kb of memory.

The monitor was the Iiyama VisionMaster Pro, which, with its Diamontron tube, gives exceptional quality: sharp colours, and free of flicker and moiré at 1024 x 768. The on-screen controls are relatively easy to use.

AST

Dan

Carrera

Evesham

In line with several of the manufacturs in this test, Evesham Micros has gone for a memory-laden machine. So, on the Intel board, which includes the HX chipset, 32Mb of EDO RAM had been fitted. The HX chipset is engineered to make maximum use of large memory arrarys, so the 32Mb makes sense. However, Intel also claims that the HX does away with the need for cache. Like all the manufacturers using the chipset, however, Evesham played safe, adding 256Kb of pipeline burst cache. The company had also gone for a 2Gb hard drive.

On the motherboard there are only four SIMM slots, as opposed to the Rhinetstone's six, and there are no on-board graphics or sound chips. Instead, Evesham has added a Matrox Millenium and an AWE-32 sound card.

The office application benchmarks were respectable, but not outstanding. The Doom and Corel scores were level pegging with those machines which came with the same graphics card.

The 17in Iiyama VisionMaster is free of flicker and moiré at 1024 x 768. The colours are not as sharply dfined as they might be, and it doesn't quite match the quality of the VisionMaster Pro, but it is still a nice monitor to use.

Gateway

Gateway has produced a consumer machine at the cutting

PCW 200MHz Photography by David *Whyte*

edge of the new technologies — an eight-speed CD-ROM drive and a new board, chipset and RAM type. The Intel Tigereye motherboard in this machine does not include on-board video and graphics chips. Gateway has provided the flexibility to add a Matrox Millenium graphics card with 4Mb of WRAM and an Ensoniq wavetable sound card.

The VX chipset is engineered to enhance multimedia and office applications. Also on the motherboard is a USB connection and the infra-red option, both ready to be implemented when these standards are introduced.

All 16Mb of the SDRAM is in one of the two 128-pin DIMM slots. SDRAM takes full advantage of the VX chipset: as it is dual input, it does not have to be paired for optimum performance.

In spite of the new technologies, the Gateway was not noticeably faster than the other Pentiums with 16Mb of RAM. Despite Intel's claim that VX is the chipset for office applications, it did not do outstandingly well on these tests. The Corel test in particular was comparatively slow, despite the extra WRAM, probably due to the superior performance of the ATI chip, which is an extremely fast mover.

The 17in monitor is a rebadged Sony Trinitron. The quality of the screen is therefore excellent, producing very sharp images at 1024 x 768. The controls are easy to use and the surround is attractive, the colours are not as clearly defined as they could be.

Gateway

Evesham

Panrix

Among all those manufacturers who submitted Pentium machines, Panrix was the only one to go for the SCSI option. It has a 2Gb SCSI Quantum Grand Prix hard drive and a Plextor 8X SCSI CD-ROM drive, connected to an Adaptec 2940 SCSI card. Also included in the deal is a Rockwell 288 internal fax modem.

The SuperMicros motherboard carries the 430HX chipset and six SIMM slots. Just for good measure, Panrix had stuck in 32Mb of EDO RAM and 512Kb of cache, despite Intel's assurances that the HX chipset allows for cacheless machines.

The setup of the Panrix with its SCSI components gave us the best opportunity to run it head to head with the Cyrix from Red Box. The only component difference apart form the chips, was that the Panrix had more cache. It acquitted itself well, but it was not nearly on a par with the Red Box and was beaten by two machines with EIDE configurations. The Corel and Doom scores were very similar to the other Pentiums with a Matrox Millenium graphics card.

The 17in monitor is the excellent Iiyama VisionMaster Pro, which, with its Diamontron tube, is always a safe bet.

Red Box

The Red Box was the only Cyrix machine we saw. At the time of writing, there are only three Cyrix P200+ chips in Europe, but the DFI boards are in even shorter supply.

Red Box managed to get us this system quite late, and it is very much a pre-production model. The production model will have 512Kb cache and a different motherboard.

The spec is excellent all round. It has a 2Gb SCSI hard disk and a six-speed SCSI CD-ROM drive, 32Mb of EDO RAM and 256Kb of pipeline burst cache. The board was the new DFI motherboard, which runs at a much faster 75MHz. All the Intels were running on 66MHz boards. Cyrix believes that by increasing the board speed, and with its own processor architecture, it can continue to increase the speed of their chips. Intel, meanwhile, has stuck at 200MHz.

Panrix

We had heard that the P200+ was outperforming the Intel Pentium 200s by a significant margin, and it was indeed encouraging to find this to be the case. On the benchmark tests, the Cyrix seriously outpaced the Intel-driven machine. The machine that provided the best comparison of components was the Panrix, which was also a SCSI system. The Panrix scored only 4.24, compared to 4.55 for the Red Box — a clear margin.

The Red Box did not do so well on the Doom and Corel tests, despite the fact that the graphics card, a 128-bit Imagine from Number Nine, is a far superior card. This can be put down to the drivers, which are still in beta and have yet to ignite the card's full hardware capability.

Red Box

Viglen

Like AST, Viglen has opted for Intel's Rhinestone motherboard which has been engineered for the 430HX chipset. So, there are six SIMM slots for EDO memory to take advantage of the chipset's ability to get optimum performance from large memory arrays. Only 16Mb of EDO RAM had been fitted.

A Creative Labs Vibra 16s chip and an ATI Mach64 chip are also on the board and allow for an uncluttered machine, with the PCI and ISA located on a riser card, free. There is space on the board for upgrading video memory, avoiding the need to use unified memory architecture for increased graphics performance.

Performance-wise, the Viglen was a good all-rounder. While obviously not as fast in the office application tests as the Gateway with its VX chipset, it performed solidly on all three tests. It turned in very good marks for Doom and Corel, showing the power of the ATI video chip and its own tidy configuration. The TEAC eight-speed CD-ROM drive also enhanced the overall capability.

The 17in monitor was the only weak point. The controls were initially hard to figure out, and there is nothing more annoying than having to peruse the manuals to work out how to increase the screen size. Neither was it as sharp as it could be at 1024 x 768.

Viglen

Processors: where next?

This is the last of the Pentiums as we know them — Intel has intimated that this is the highest clock speed it will be going for. The next step is to be the P55C with MMX capabilities (enhanced video, audio and graphics) in the autumn, and a low-end Pentium, the Pro P6, in the new year.

Meanwhile, Cyrix is going from strength to strength. The P+ processors have proved to be extremely successful, with optimised 16-bit and 32-bit all in one chip. The company is rumoured to be planning to take the speeds higher. It has introduced a new 75MHz motherboard from DFI to support this, breaking the previous, three-year-old standard of 66MHz as the maximum board speed. As the clock speed of the P200+ is 150MHz, it runs at twice the speed of the board; unlike the Pentium 200MHz, which is clocked at three times the speed of the board.

The introduction of the 200MHz machines have coincided with some interesting innovations in boards and PCI chipsets to support the Intel processors. We had already seen the VX chipset in the Dell Pentium 166 ,and in this test, the two varieties of Triton 2 for the Intel processors, 430HX and 430VX, were all we saw.

PCI chipsets are engineered to increase speed throughput by interfacing more efficiently with I/O, external cache, memory and graphics subsystems. The two have been developed with different users and applications in mind.

The HX is geared towards business machines. It has been optimised to work with large memory arrays — that is, up to 512Mb — so the new Intel Rhinestone board therefore has six SIMM banks. Intel claims that with EDO RAM and no cache, the performance is equivalent to "today's systems" with asynchronous cache; however, all the machines we saw with HX also had a minimum of 256Kb of pipeline burst cache. It is the age-old argument. EDO improves performance significantly, and adding asynchronous cache does not make that much difference; but by adding pipeline burst cache, you are increasing your system's performance by approximately five percent.

HX has been developed with networking, video conferencing and MPEG playback in mind. VX, meanwhile, has been aimed fairly and squarely at the consumer market. It is intended to speed up multimedia and office applications, and it is optimised for 16-bit, rather than 32-bit, like the HX. The relative merits of HX versus VX are hotly debated. VX is being touted by Intel as being the better chipset, yet many of the manufacturers we spoke to thought the reverse. VX boards are cheaper, however, so VX may eventually predominate.

VX has been designed to work with SDRAM. Although the performance gains are slight for this type of RAM over EDO RAM, the advantage is that it can operate efficiently from a single module and does not need to be paired.

Also on many of the boards we saw were six little pins intended to take a USB connection, when this standard is launched in the autumn. USB allows plug-and-play connectivity with up to 127 devices on a single PC. Any number of different devices can be connected, from keyboards and mice to scanners and digital cameras.

The idea is to do away with expansion cards for devices, so the non-technical user can attach whatever they like to the PC without having to open it up. USB will also determine what host resources, including driver software and bus bandwidth, each peripheral needs, and will make those resources available without user intervention.

Editor's Choice

As these are new chips, our Editor's Choice and Highly Commended awards are being given solely on raw performance. The choices are therefore clear.

First to be highly commended is the Armari, for the fastest Intel Pentium 200MHz with 32Mb of RAM. Its office application tests just nudged out the Dan, and its Doom score was nearly the best we saw.

The second highly commended is Viglen, for the fastest Intel with 16Mb of RAM. It had excellent all-round performance, only eclipsed by others in the test by its memory size.

Finally, a very well deserved Editor's Choice goes to the Red Box Cyrix . A must for anyone who wants to run both 16- and 32-bit applications full whack, and with a superb spec, this is a great machine. However, the real reason for giving it the Editor's Choice award is, beta drivers excepted, because it is an exceptional little performer.

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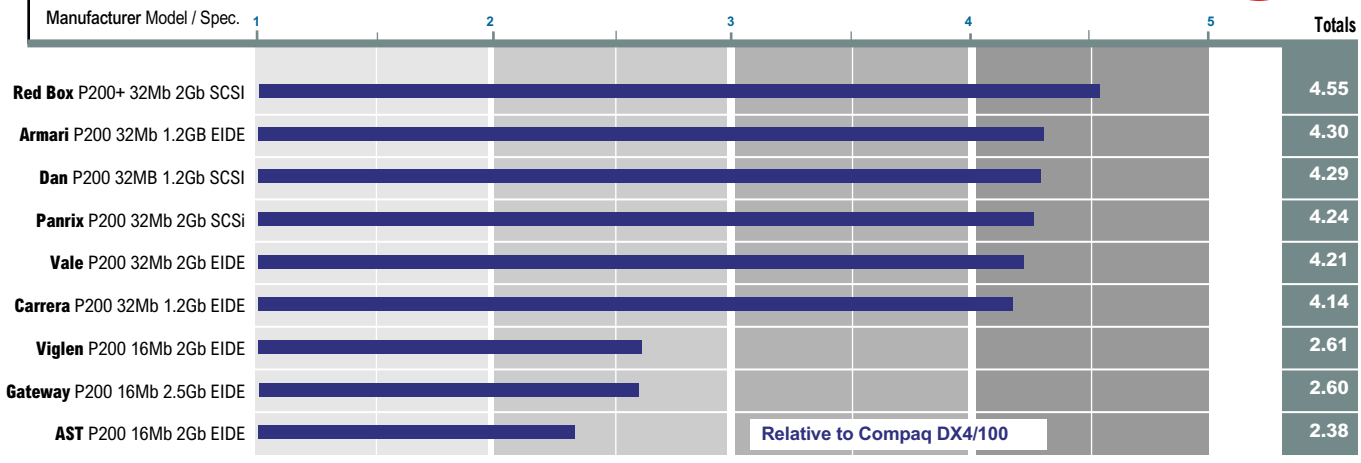
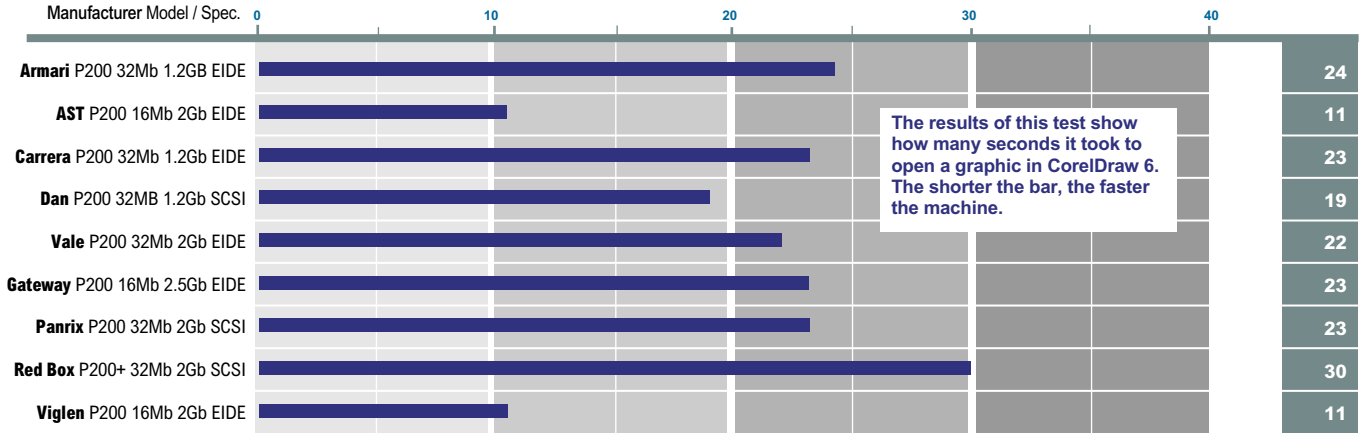
Performance Results

For details of how we did the tests, see the P133 group test on page 124.



Corel scores



Doom scores

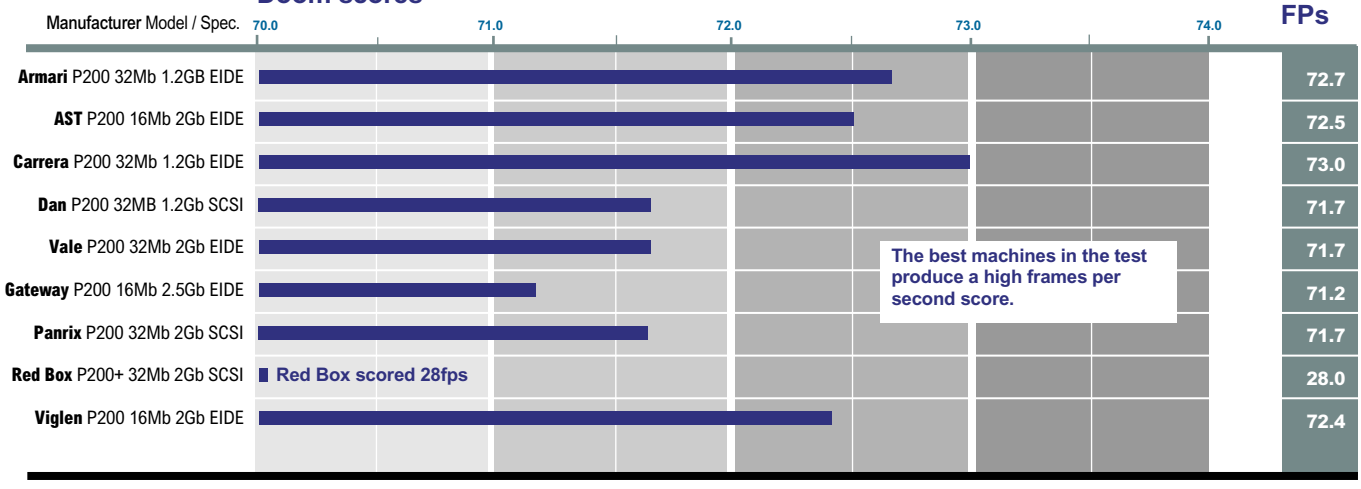


TABLE OF FEATURES

Manufacturer Model Name	Armari Arcturus	AST Bravo MS-T 5200	Carrera Carrera Power Media P200	Dan Dan Ultimate Plus	Evesham Micros Vale Platinum HXse P200
Tel No	0181 810 7441	0181 587 3000	0171 830 0486	0181 830 1100	01386 765500
Fax No	0181 810 8846	0181 587 3303	0171 830 0286	0181 830 1122	01386 765354
Price (excl VAT)	£2,339	£2,245	£2,295	£2,711	£2,199
Processor	Intel Pentium 200	Intel Pentium 200	Intel Pentium 200	Intel Pentium 200	Intel Pentium 200
Local bus Architecture	PCI	PCI	PCI	PCI	PCI
Free local bus only slots	3	2	3		2
Free ISA only slots	3	5	3		1
Free shared local Bus/ISA slots	1	0	0		1
Motherboard Manufacturer	Tyan	Intel	Super Micro	Asustek	Intel
Chip set	430HX (Triton 2)	430HX (Triton 2)	430HX (Triton 2)	430HX (Triton 2)	430HX (Triton 2)
No. of spare 3.5in /5.25in bays	1, 2	4, 3	1, 2	1, 4	4, 1
Hard Disk Size and interface	Quantum 1.2Gb EIDE	Seagate 2Gb EIDE	Quantum 1.2Gb EIDE	Quantum 1.2Gb EIDE	Seagate 2Gb EIDE
RAM	32Mb / 512Mb EDO	16Mb / 192Mb EDO	32 Mb / 256Mb EDO	32Mb / 128Mb EDO	32Mb / 128Mb EDO
Secondary cache (Kb)	512Kb pipeline burst	256Kb pipeline burst	512Kb pipeline burst	512Kb pipeline burst	256Kb pipeline burst
CD-ROM Drive	TEAC CD-58E	Sanyo CDSR1	TEAC CD-56E	Panasonic PD	Panasonic CR 583
CD-ROM speed and interface	8X EIDE	6X EIDE	6X EIDE	4X EIDE	8X EIDE
Sound Card	CL SoundBlaster 32 PnP	CL Vibra 16s	CL SoundBlaster 32 PnP	CL AWE 32	CL SoundBlaster 32 PnP
Graphics Card	Matrox Millenium	ATI Mach 64 VT	Matrox Millenium	Matrox Millennium	Matrox MIL/2i
Graphics Card RAM/Max RAM	2Mb / 8Mb	1Mb / 2Mb	4Mb / 8Mb	2Mb / 8Mb	2Mb / 8Mb
Graphics Card max non-interlaced resolution	1600x1200 @ 85Hz	1280x1024x156 @ 72Hz	1600x1200 @ 85Hz	1600x1200 @ 85Hz	1600x1200x156 @ 65Hz
Monitor	Iiyama VisionMaster Pro 17	AST ASTVision	Iiyama VisionMaster 17	Iiyama VisionMaster Pro 17	Iiyama VisionMaster 17
Monitor Size / actual size	17in / 15 7/8in - 404mm	17in / 15 5/8in - 396mm	17in / 15 7/8 - 404mm	17in / 15 7/8in - 404mm	17in / 15 7/8in - 404mm
Monitor Maximum Refresh Rate at 1024x768 (Hz)	107Hz	75Hz	85Hz	85Hz	85Hz
Software supplied	Win95	Win95	Win95	Win95, Encarta 96	Win95
Speakers	Yamaha YST-M20DSP		Yamaha YFTM-15	Dan Hi-Fi	
Extras			28.8 fax modem	Dan 28.8 fax modem	
Warranty	1 yr on-site next day response	3 year return to base	2 yrs parts, 3 yrs labour	1 year back to base	1 year on-site
Warranty Options	2nd and 3rd year and on-site	Dealer	On-site £25 for 1st year	On-site	2nd and 3rd year
Free technical / fax support	No / Yes	Yes / Yes	Yes / No	No / Yes	Yes / Yes

TABLE OF FEATURES

Manufacturer Model Name	Gateway Gateway 2000 P5-200 XL	Panrix Micron P200	Red Box Winstation CP200+ Pro 128	Viglen Viglen Genie PCI P5/200
Tel No	0800 552000	0113 244 4958	01480 405541	0181 758 7000
Fax No	00353 1848 2022	0113 244 4962	01480 471687	0181 758 7080
Price (excl VAT)	£2,199	£3,145	£3,362	£2,279
Processor	Intel Pentium 200	Intel Pentium 200	Cyrix P200+	Intel Pentium 200
Local bus Architecture	PCI	PCI	PCI	PCI
Free local bus only slots	4	3	2	1
Free ISA only slots	3	3	3	2
Free shared local Bus/ISA slots	1	0	1	1
Motherboard Manufacturer	Intel	Super Micro	DFI Screamer	Intel
Chip set	430VX (Triton 2)	430HX (Triton 2)	VLSI Lynx	430HX (Triton 2)
No. of spare 3.5in /5.25in bays	0, 3	0, 2	1, 2	0, 0
Hard Disk Size and interface	Western Digital 2.5Gb EIDE	Quantum 2Gb SCSI	Seagate 2Gb SCSI	Western Digital 2Gb EIDE
RAM	16Mb / 64Mb SDRAM	32Mb / 256Mb EDO	32Mb / 256Mb burst EDO	16Mb / 192Mb EDO
Secondary cache (Kb)	512Kb pipeline burst	512Kb pipeline burst	256Kb pipeline burst*	256Kb global pipeline burst
CD-ROM Drive	Toshiba XM-5602B	Plextor PX-83CS	TEAC CD-56S	TEAC CD-58E
CD-ROM speed and interface	8X EIDE	8X SCSI	6X SCSI	8X
Sound Card	Ensoniq Vivo	CL Vibra 16	CL SoundBlaster 16	CL Vibra 16s
Graphics Card	Matrox MGA	Matrox Millemium	#9 Imagine 128 Series 2	ATI Mach 64 VT
Graphics Card RAM/Max RAM	4Mb / 8Mb	2Mb / 8Mb	4 Mb	2Mb / 4Mb
Graphics Card max non-interlaced resolution	1600x1200x65,000 @ 75Hz	1600x1200x256 @ 72Hz	1600x1200x256 @ 82Hz	1280x1024x256 @ 75Hz
Monitor	Gateway 2000 Vivitron 1776	Iiyama VisionMaster Pro 17	Iiyama VisionMaster Pro 17	Viglen Envy 17E
Monitor Size / actual size	17in / 16 2/8in - 410mm	17in / 15 7/8in - 404mm	17in / 15 7/8in - 404mm	17in / 15 3/8in - 390mm
Monitor Maximum Refresh Rate at 1024x768 (Hz)	1280x1024 @ 60Hz	85Hz	85Hz	75Hz
Software supplied	Win95, Office Pro 95, Encarta 96	Win95, Office 95 Pro	Win95, Office 95	Win95, MS Works 95, CD
Speakers	Altec Lansing ACS 400	Yamaha M15	Atltec Lansing ACS5	Yamaha MSW-10
Extras		28.8 Supra Modem	CMD 6520 cacheing controller	
Warranty	1 yr on-site, 2 yr rtb	2 year on-site	1 yr on-site	1 year collect and return
Warranty Options	3yr next day on-site	3rd year option	2nd and 3rd	optional on-site
Free technical / fax support	Yes / Yes	Yes / Yes	Yes / Yes	Yes / Yes

* The full production model will have full 512Kb cache.

Shuffling papers

Chuck out your filing cabinets; the paperless office is just around the corner.

Dylan Armbrust reviews three affordable document management packages.

IF EVER THERE WAS A QUEST for the holy grail of the computer age, it has to be the pursuit of the truly paperless office. It has been talked about for decades, but the reality is that it just hasn't happened. You still see tons of faxes, printouts, forms and the like flying about the office from in-tray to out-tray or being pushed about on the ubiquitous post-boy's trolley. There is light on the horizon, though, with a wave of new document management software.

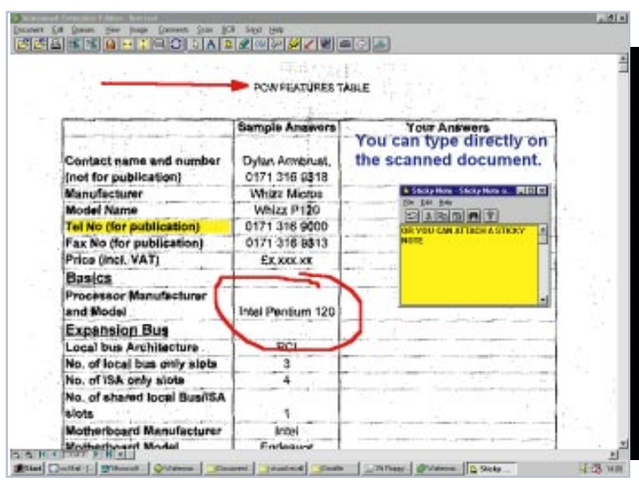
Document management isn't all that new. It's been around for years but only recently has the scanning, storage, and networking technology developed enough to make it a cost-effective option.

The key word here is storage. With the development of 1Gb, 2Gb, 9Gb and greater hard disk drives costing relatively little, the option of using Document Management Systems (DMS) is now attainable for the individual or small business. There are now well over 40 document management software packages available in the UK, ranging from massive WAN-based systems for large corporates, to small, single-user setups. But what, exactly, is document management and who really needs it?

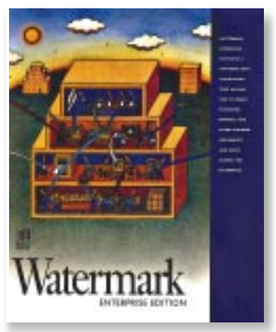
Document management is, in simple terms, a document storage and retrieval facility of unstructured information. This information can consist of faxes, emails, word-processed documents, databases, scanned images, and so on. Once the information has been digitised in the correct format, there's almost no limit to it being handled by a DMS. The stored information can then be recalled, circulated, amended, and archived depending on the user's needs.

Until now, the biggest users of DMS have been corporations and local governments, who use it to track data arriving from sources outside the organisation. But smaller firms and single users are now beginning to see the benefits of DMS. Medical and legal practices are examples of those small firms which could use the technology. Individuals, like freelance business consultants, could also make use of DMS, but as single users.

We've taken a look at three DMS packages, orientated towards small and large users alike, to see what they offer and how they compare.

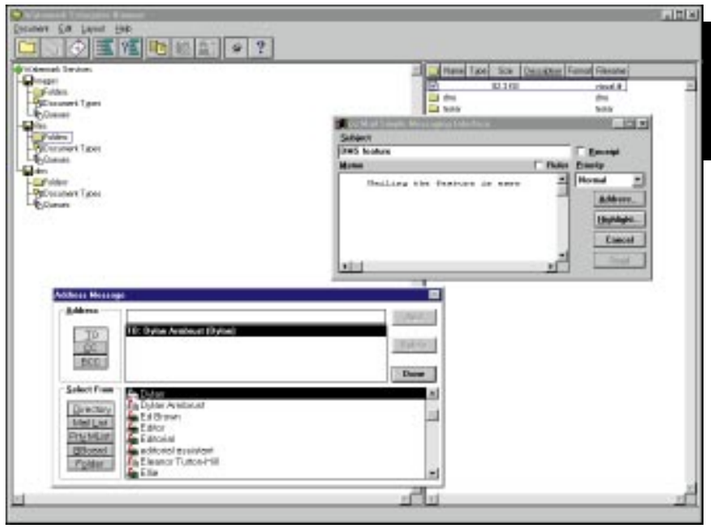


There's almost no limit to annotating an image file in Watermark. Note how you can highlight, type, red-line, or place a sticky note directly on to the image



Watermark Enterprise Edition

The Watermark Enterprise Edition impressed us as the most versatile of the DMS packages we examined.



Watermark's versatile email function integrates with all VIM and MAPI-compliant email packages, such as cc:Mail or MS Mail

It can handle an array of electronic documents, faxes, image files, email, form templates and more. Like the other packages in this review, it can act either as a standalone solution or operate in a networked environment. Its main purpose is for use within a network and Watermark is capable of operating under Novell, Windows NT, Banyan Vines, LAN Manager, Unix, and a few other network platforms.

Watermark has an in-built imaging and OCR (optical character recognition) component that allows for direct scanning and importing of documents into the Watermark program, thus eliminating the need for any secondary scanning software and file conversion.

Getting acquainted with Watermark takes a bit of time and dedication, but once you understand the basics it becomes fairly intuitive. The interface is remarkably similar to Windows 95 Explorer in look and feel, which makes it easy to adjust to, for those familiar with Windows 95, although anyone who is familiar with Windows in general will have no trouble coping.

The creation of folders is carried out via the Watermark Browser simply by clicking a button on the toolbar. From here, you can import files by a menu command or by dragging and dropping them into a chosen folder.

One of the key elements of Watermark that sets it apart from others is its folder enabling feature. This allows you to attach a folder created in Watermark, via OLE (object linking and embedding), to any entity that exists in another application. So if you want to place a collection of images and documents pertaining to a particular document (say, a lease agreement), you simply embed that particular folder in an application document such as Lotus Notes, or a Word document. You can then circulate the document using the email feature and the recipient can view and edit it, provided they have the right access privileges. It's not quite a true work-flow solution but it certainly adds to the program's functionality.

Watermark additionally provides the ability to edit or comment on circulated files. This is particularly the case with image files. Watermark enables highlighting, sticky-note attachments, arrow marks, direct text typing and red-lining.

All documents are indexed according to common properties such as date, author and document name. You can add additional properties, too, like keywords

Affordable Adobe Acrobat

You might not readily associate Adobe's Acrobat with document management. It was launched as a means of exchanging formatted documents between different platforms, such as the PC and the Mac, and gained importance with the growth of the Internet because it can be used to publish Web pages.

Its files are stored in Portable Document Format (PDF), a compact derivative of PostScript which preserves the look of a document, and can be subject to a full text search. The prime advantage over other archiving formats is that the files can be viewed on any type of machine.

Acrobat got off to a bad start when Adobe charged for the reader (or rather, readers… one for each platform), which meant you could exchange PDF files only between Acrobat users. The readers are now free.

Adobe also sold a program called Distiller to translate Postscript (and thus the output of virtually any word processor or desktop publisher) into PDF. A later module, called Capture, opened Acrobat to document management by translating a scan into PDF. But, again, Adobe priced these modules for the professional market and missed a good chance of establishing PDF, early, as a global interchange standard.

The good news is that the new Acrobat 3.0, due out in September, bundles all these modules into a single, affordable, package which can be used for capturing, storing and searching documents. And it costs just £160, which is just a sixteenth of the price you would have paid a year ago (see *Newsprint*).

Clearly, file sizes are greater than for raw text but they are not that big. Peter Green, technical development director at *The European*, which both publishes and archives its editions in PDF, told me he bought a 9Gb disk to hold the files and after a year had used up only 340Mb. You could hold a lot of letters on, say, an Iomega 1Gb superfloppy.

The Capture module automatically performs character recognition, substituting bitmaps where it does not recognise a word. You get a chance to edit the result critically to ensure that key words are recognised for when Acrobat does a search. There's an option to store a full bitmap, where necessary for legal reasons.

The remaining advantage, which may prove the most important for some companies, is that PDF allows existing documentation to be turned into more-or-less instant Web pages for internal or external publication.

● Adobe 0131 453 2211

Clive Akass

to make searches easier.

One area where Watermark falls down is in its search capability which, unlike the Visual Recall or PageKeeper search features, is a bit cumbersome to use. The Watermark search function is essentially limited to the defined properties of the document or folder properties. When a document is created, Watermark automatically assigns a series of basic properties such as document name, date and so forth.

Unfortunately, you can't perform a straight text search, nor does it contain a Boolean search feature. This is unfortunate because performing a search becomes more time consuming and requires the user to be more aware of document attributes, which could prove problematic once you begin accumulating high volumes of documents in the databases. Also, the search results don't provide an indication of weight or relationship as Visual Recall and PageKeeper both do.

Security access, for those operating in a networked environment, is easy to administer. There are three levels: read, change and full access. These levels can be assigned to individuals or to an entire group, and they follow the user and document wherever they go. So, if a form is emailed from a full access user to a read-only user, the recipient will not be able to amend the form.

Watermark can handle any VIM (Vendor Independent Messaging) or MAPI-compliant (Microsoft Mail Application Program Interface) email application such as Microsoft Mail, cc:Mail and Lotus Notes, and automatically configures this feature during installation. There was obviously some forethought put into this feature because it gives you three options: message only, message with linked document, and message with entire document.

The message with linked document works only if the recipient has access to a Watermark image service where, instead of sending the whole document, it acts as an automatic pointer to the folder or document location on the server.

The Watermark Enterprise Edition is also ODMA-compliant (Open Document Management Architecture), which allows it to integrate with other large scale DMS/workflow packages such as Saros Mezzanine and SoftSolutions.

This is a strong DMS package that is ideal for a small to medium-sized organisation which is trying to get a handle on its paper-flow. If you're looking for a decent scanning, storage and retrieval package and you're willing to take the time to learn the program, in the long run you'll find Watermark to be a powerful tool.

PCW Contacts

Watermark Enterprise Edition
Price £225 (plus VAT) for Client Viewer single licence; £1,069 (plus VAT) for a five-user licence; scalable for more users.
Contact Watermark 0181 953 9374
● *Works under Win 3.1 or Windows 95*

Visual Recall 2.0

Visual Recall, from Xsoft, is definitely the sexiest looking DMS of the lot. Its minimalist look hides its complex features, which is a good thing as you don't feel intimidated when using it.

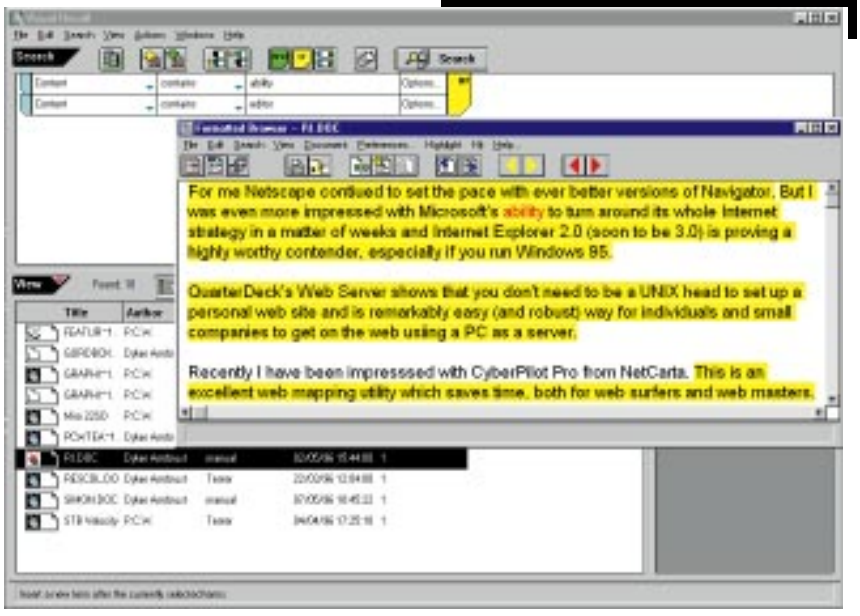
Like most other DMS packages, Visual Recall is a completely scalable application that can accommodate up to several thousand users. It has been specifically designed with Novell NetWare-based workgroups in mind but can be used in a standalone environment.

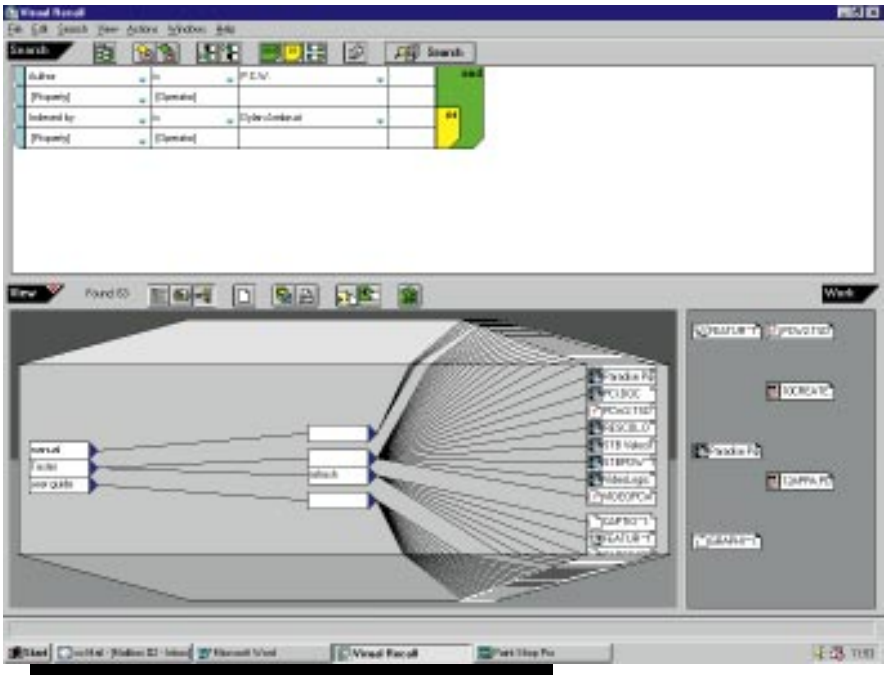
It allows users to easily find, browse, edit, mail and, most importantly, share documents even if they have been created in differing applications or are located on different servers. Documents can be imported from other applications, form email, or directly from scanners. Visual Recall comes bundled with Textbridge to provide for a seamless, integrated, image capture and/or OCR ability.

Its main strength lies in its storage and indexing capability. All you have to do is create a cabinet (in essence a database) using the Cabinet Administration feature, assign a set of properties such as date or author, and away you go. Placing and indexing files requires you only to select, drag and drop a document or file into Virtual Recall and the process of indexing automatically begins. After that, you only have to select in which cabinet the data is to be stored.

One of the first things to strike you is the simple interface. The application window is divided into three areas called panes where all of the Search, View and Work tasks take place. The search function is impressive by any standards and has by far the best search engine of the DMS packages reviewed here. It not only performs simple text or phrase

Visual Recall's simple search interface hides its sophisticated search engine. It performs text, Boolean, Proximity, and Similar Document searches and highlights your findings





The spiffy 3D View Pane in Visual Recall shows the relationship of files and documents according to your search criteria

searches but Boolean, Proximity and Similar Document searches, too. In addition, various display options such as "Snippets", or weighting, allow the user to instantly ascertain the relevance of the document for which they are searching.

Visual recall will also provide a tree or 3D grid display of the relationship between documents, which can be particularly useful if you need to know a document's origins. XSoft has certainly grasped the idea that people just want to type in a few key words or properties, thus allowing them to avoid having to know file names or locations.

Once a particular document has been located it is easy to view and edit it. Visual Recall has five types of browser: excerpts, formatted, native, image and mail, and attachment. These browsers let the user view their documents with ease, without the worry of accidental alterations.

For document management, which is handled in the Work Pane, Visual Recall has check-in/check-out and version tracking features which allow for a group of users to work together, either on single or sets of documents or images. This isn't like the work-flow solutions offered with the larger packages but it does allow users to edit files without difficulty. But unlike PageKeeper or Watermark, Visual Recall doesn't allow annotation or highlighting on image files. The lack of this feature makes Visual Recall more of a text-orientated package as it seems better equipped to handle electronic documents. Access rights to documents are determined by a system administrator and access can encompass view only, edit, and full rights but these are only applicable on a network-based system.

Visual Recall does, however, support OLE links and you can easily save, edit and mail OLE embedded files to and from Visual Recall. It also supports all the major file formats for both image and electronic documents for all the major applications such as Word, Word Perfect, Excel, and Photoshop as well as Adobe Acrobat pdf files. In addition, it is ODMA-compliant, affording greater flexibility for those wanting to integrate further DMS packages down the line.

On the whole, Visual Recall is an ideal DMS for a the small workgroup. It's easy to administer, straightforward to use and can help reduce an office's physical paper flow quite easily. The drawbacks we encountered were its lack of support for email packages other than Microsoft Mail, and its inability to annotate image files, which is a tragedy because it limits the appeal of an otherwise solid package.

PCW Contacts

Visual Recall 2.0
Price £300 (plus VAT) for a single user; scalable up to thousands of users.
Contact XSoft 01753 550022

● *Works under Win 3.1 or Windows 95*

PageKeeper

Comparatively, PageKeeper is the most rudimentary DMS package of all in this review. But it's also the simplest to use, which makes it ideal as a standalone DMS solution. It can also be used in a network environment — Caere sells PageKeeper for Workgroups for this purpose. It has much the same functionality as the more high-powered packages but doesn't incorporate any workflow solutions.

What PageKeeper does have is all-in-one capture, store and retrieve capability. Files can be imported from email, word processing packages, fax servers, online services or directly from a scanner. The scanning feature is an actual part of the software, not an addition, and allows the image to be imported directly into PageKeeper thereby rendering format conversion unnecessary. Images can be stored "as is", or if text is present it can be read via OCR.

Once the document or OCR'd image has been chosen it goes through an indexing process before being stored in a selected database. The document is then indexed, based on PageKeeper's Natural Language Processing Technology. This analyses the content of the document and potential topics. It is these topics which, when placed into indexes, become the file's name.

The key to any DMS package is its search and retrieval abilities and PageKeeper provides various search techniques. You can use the Word Search, Boolean, or Similar Document search engines to locate any file required from the database.

Unfortunately, Word Search offers only specific word searches, not proximity searches like Visual Recall. Once it has located the text, it highlights and ranks the document using its own Weighted Relevance Retrieval method according to its potential relevance. The result of the

search is then graphically displayed, using a combination of bar graphs and colour to indicate relevance.

The Boolean and Similar Document search engines work just as well (the display of the latter's search results looks very similar to Visual Recall's) but only according to the keywords assigned by PageKeeper.

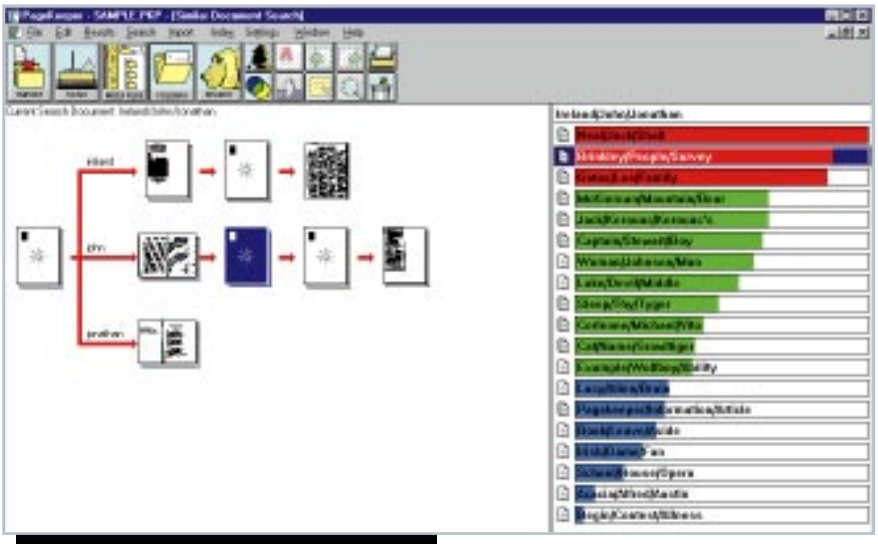
The package easily supports and imports all of the major file formats, from .tif to .txt to .doc, but we found that it doesn't recognise files from the Office 95 (version 7.0) suite. It allows document editing, as well as adding Notes attachments to image files, for any additional comments but this is as far as it goes. It doesn't have any text highlighting or red-lining features like that of Watermark.

PageKeeper also manages to integrate search and import facilities into other applications via PK Direct, allowing you to find related documents but your search is limited to files contained only in PageKeeper databases. It is handy to use, however, if you need to find a specific tract of text or information while working in another application. All you do is launch a search, select your document and copy and paste your data into a currently open document. Regrettably, it doesn't support any OLE features.

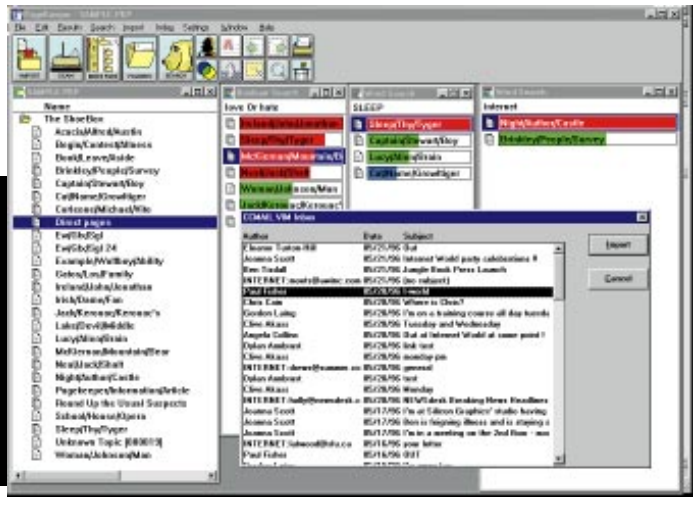
The look and feel of PageKeeper is quite intuitive, with all the major functions iconised for easy launching. Visually, the database display resembles Windows File Manager. Adding more databases isn't a problem, in fact it proved to be much easier than either Watermark or Visual Recall. All you need to do is select New Database. This is in contrast to opening up a separate database application like that of Cabinet Administration or Browser in Visual Recall and Watermark.

As long as you can follow the indexing style, or run a search, it is easy to locate a document. In terms of circulating documents, this can be done via the mail function using VIM or MAPI-compliant mail packages (such as MS Mail or cc:Mail), or you can fax the document directly from PageKeeper. Regrettably, it will only send an attached document in a .pk2 (PageKeeper) format so the recipient, too, needs PageKeeper to open the document. This process works in reverse with PageKeeper's facility to import files directly from email, fax, and online services. We tested the email and online service import facility and found it worked flawlessly, as long as the file is in a format that PageKeeper recognises.

PageKeeper does what it aims to do. It captures, stores and retrieves while incorporating a bit of application integration through PK Direct and its mail functions. It's unsophisticated, compared with the others, but it's adequate as a standalone DMS for small businesses or individuals who need manage their documents and reduce their paper flow.



The simple-looking interface belies Pagekeeper's search abilities. Bar graphs and file trees show the relevance and relationship of found documents



Pagekeeper also lets you send or receive indexed documents via Lotus's cc:Mail or Microsoft Mail, but the recipient must have Pagekeeper to read the file

PCW Contacts

PageKeeper
Price £79 (plus VAT); £459 (plus VAT) PageKeeper for Workgroups Version 2.1; £345 (plus VAT) upgrade to workgroup.
Contact Caere Info Centre 0171 222 3200

● *Works under Win 3.1*

Conclusion

Reviewing and comparing software has always been a difficult task, particularly true in the case of these DMS packages. All of them set out to achieve the same objective and that is to capture, index, store and, when called upon, retrieve documents. So when forced to choose between them, you must look not only at the basics but also the little extras that complement the whole.

In this case, our vote goes to the Watermark Enterprise Edition. It wasn't the easiest package to learn and, like the others, it can operate as a standalone DMS or as part of a small to vast network setup, but it was the most versatile. It can operate in many network environments; supports full OLE functionality; and has full mail, fax and routing capability. What sold us, however, was the comment and annotation feature for image and document files. Sadly, the others fell short here. The one weakness we felt strongly about was Watermark's limited search facility and we noted that XSoft's Visual Recall was superior in this regard.

If you're finding your desk or office is beginning to overflow with paper then we'd recommend you look into a DMS solution. Whether you're an individual consultant or involved in a small to medium sized firm you'll find all of the above DMS packages are worth a look. They won't provide the paperless office but you might find you deal with less paper and that is definitely progress.

NT 4.0 *on top*

Will the new Windows NT 4.0 be a turning point in NT's history and promote the Workstation edition to wider use on the desktop? Dale Strickland-Clark tests the Beta 2 version.

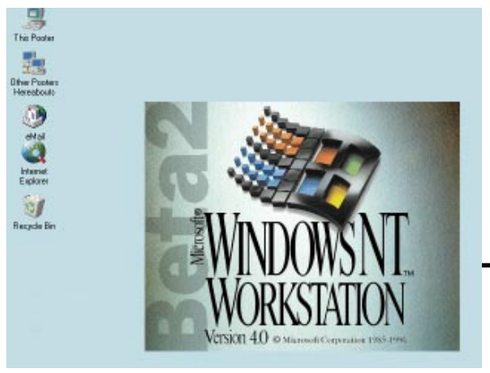
THE CLONED BUILDINGS, CAR parks and tended playing fields of the Microsoft headquarters, "The Campus", spread beyond every corner of the private road. When you need a corporate minibus service to run around all day taking your staff from office to office but never leaving your grounds, you know you've made it.

A company the size of Microsoft has to have something special and needs to keep coming up with more that's special, to sustain itself. It could be said that DOS was a lucky break. Technically stunted, it compared poorly with every other microcomputer operating system of the day. Without IBM's adoption, it would have vanished without trace.

Windows was a me-too product following Apple and Digital Research's GEM. It lacked innovation and was hindered by the limitations designed into the original PC. Nevertheless, by version 3.0 it was transforming the working environment, and the needs of Windows redefined the minimum PC specification.

Windows NT is different. This is no lucky break, neither is it a copycat product, and it hasn't been a smooth ride. It was born of insight, imagination, forward thinking, and no small amount of fear.

NT had to be portable because Microsoft was anxious that the Intel x86 processors, upon which the company entirely depended, couldn't match the new RISC processors in performance. Portability would mean it could always run on the fastest and most popular machines. It had to be designed without intrinsic limits, because it was clear that contemporary hardware was very far short of what was going to be available in the future and this included running on multi-processor configurations. Additionally, the ability to operate as both a workstation and a server was important. The server market was starting to take off, and a little company called Novell was making a big impact.

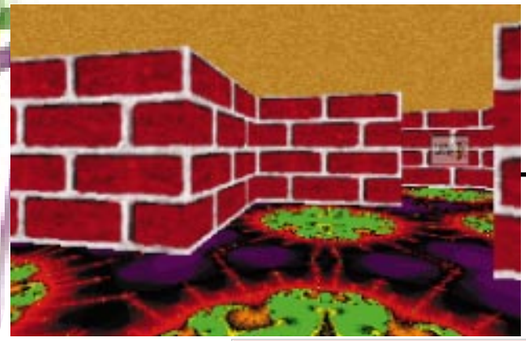


Is this Windows 95 or NT4? Can you spot the clue?

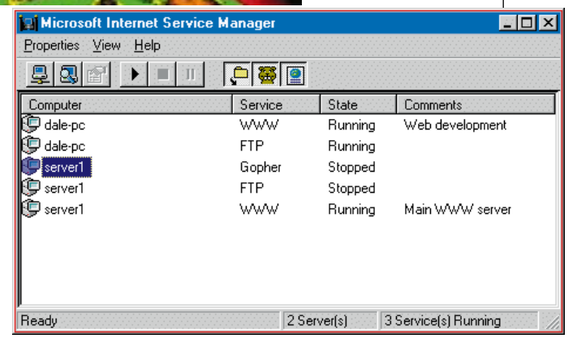
The development project turned into a monster, and later realisations that NT had to be able to run existing Windows and DOS applications to be viable, added further complexity. The first release in August 1993 was late, fat and slow but it was, at least, solid and reliable.

Version 4 is going to be a turning point in NT's history. This is the release that will see the Workstation edition more widely adopted in desktop systems where its resource requirements are on a par with a well-specified Windows 95 system. The Server edition is versatile enough for use in a range of applications, from basic file and print serving through to complex applications routed around the Internet.

You get a feeling that the whole system is slicker and more controllable. Task Manager has been replaced by a tool that really justifies the name. Beforehand, you were just presented with a list of the applications running; other processes, and anything without a window, weren't shown. Now, in addition, you have the choice of seeing every process along with a choice of resource and status details. Errant looping processes have nowhere to hide and attempting to kill one suspected of misbehaving will invoke warnings of dire consequences of lost data or system instability, if you don't know what you're doing. In fact, it's comforting to discover that the critical system components seem to be protected from wanton destruction.



The new maze screensaver demonstrates some of the new graphics capabilities. Who picked that carpet?



NT users have the means to share information and control other servers

Workstation Edition

Windows 95 user interface

The most visible change to both Workstation and Server editions is the final banishment of the tired old Program Manager in favour of the new Windows 95 look. Superficially, NT is now identical in operation to Windows 95, with the Task Bar to start and manage running applications, folders in place of directories for file storage, and shortcuts to refer to objects stored elsewhere.

NT adds to these controls for the management of object access (absent in Windows 95) and file

NT and the Internet

NT has been Internet-aware from the start. It had full TCP/IP support, a good set of tools and an FTP server built in. PPP and SLIP support were added in version 3.5, but that's how it remained until earlier this year when the Internet Information Server (IIS) 1.0, which added HTTP and Gopher servers, was released. Now it's gone mad. NT 4 includes a new release of IIS, which is claimed to be 40 percent faster, a new domain name services server that works with WINS and Point to Point Tunnelling Protocol.

IIS 2.0 supports remote administration using a set of HTML pages that mimic the original management application. Now, like some other Web servers, you can manage almost all its functions from anywhere as long as you can get to a Web browser. However, you can't start and stop the service this way.

In its battle to upstage Unix, Microsoft has simplified the migration of Web sites from Unix to NT by adding support for NCSA and CERN active maps. A further enhancement brings secure online commerce a step closer with the new Key Manager Tool, which provides fuss-free installation of keys for the Secure Sockets Layer once the applications have been processed by VeriSign's Digital ID centre. This procedure costs $290 for the first year, for one server.

DNS Server

The Windows Internet Name Service (WINS) was Microsoft's original answer to the problem of assigning user-friendly names to unintelligible IP addresses. It had the advantage of working with the DHCP service, which handed out IP addresses, to maintain a dynamic database mapping names to addresses. The big disadvantage was that it wasn't standard. The rest of the Internet world uses Dynamic Name Service (DNS) servers, so integration was a problem.

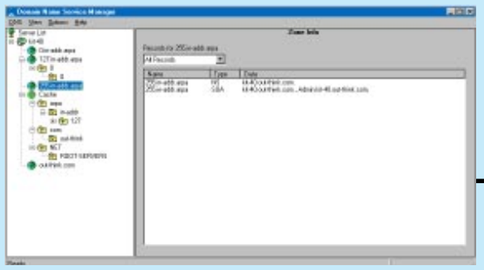
Where WINS updates itself to reflect the changing network, DNS is static, requiring manual adjustment when new hosts are added or moved. Rather than throw WINS out, when Microsoft decided to add a new DNS server to NT the company made it work transparently with WINS. The DNS server will transparently pass queries, to resolve names at the lower levels in the tree, to WINS.

The DNS manager is an easy-to-use graphical tool but doesn't overcome the need to understand the principles of DNS. This is one area where Wizards would have been worthwhile.

Point to Point Tunnelling Protocol

Public networks aren't good for private data, and while the idea of cheap local links to send data across the world is attractive, data logging equipment anywhere along the route can record the traffic.

The new Point to Point Tunnelling Protocol creates an effective private network across a public one by packaging and encrypting any protocol. This should help to dissolve the security concerns that were a barrier to using the Internet as a cheap backbone for dispersed organisations.



The Domain Name Services Manager is nice and graphical but no substitute for understanding DNS

compression (handled differently in Windows 95).

Hardware devices are also managed differently. NT still doesn't have full plug and play capability but it does manage a half-way house called "cold swapping". You can switch your PC Cards (PCMCIA) only while the system is shut down and it should spot the changes at the next boot. Full plug and play is expected later.

The display enhancements provided on the Windows 95 Plus! pack are standard on NT 4, such as the gracefully gliding Task Bar, anti-aliased (smoothed) fonts and a handful of photorealistic icons, although you'll need a graphics card with 65,535 colours, or true colour, to see these.

Under the covers, NT is very different to Windows 95 and suffers from none of the same historical baggage. It's based around a micro-kernel, the core component of the operating system which manages the hardware and system resources, handing out processor time to tasks depending on their priority and readiness. The micro-kernel contains the barest minimum of code to support and manage the other tasks, and along with a few other essential system components makes up the Executive. Tasks running in the Executive are uniquely able to access the memory of other tasks, such as application programs.

From the first release, NT 3.1, the graphical device interface (GDI) has run as a non-Executive task — a user task. All requests for graphical services from application programs went via the Executive to the GDI and back. Everything to do with presenting windows and controls on the screen took this route. The principal designer of NT, Dave Cutler, defended this approach because it gave maximum protection to the Executive and better reliability. It also slowed things down. Badly.

Subsequent releases of NT brought speed improvements by complex batching and cacheing of GDI calls, but the resultant code was more complex and made it difficult to integrate components from Windows 95.

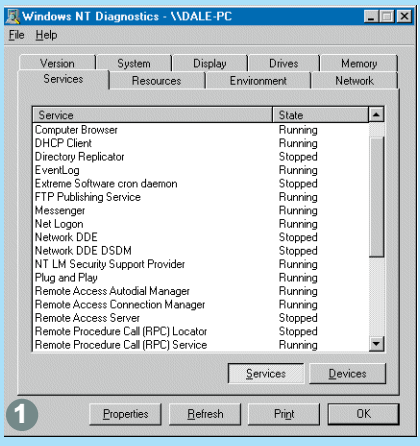
With NT 4, the decision was made to move the GDI into the Executive. The small risk to the sterility of the Kernel was considered worthwhile in view of the stunning performance gains. The difference in the responsiveness of the system makes the claimed increase in throughput, of around 500 percent, quite believable. NT is now very much snappier.

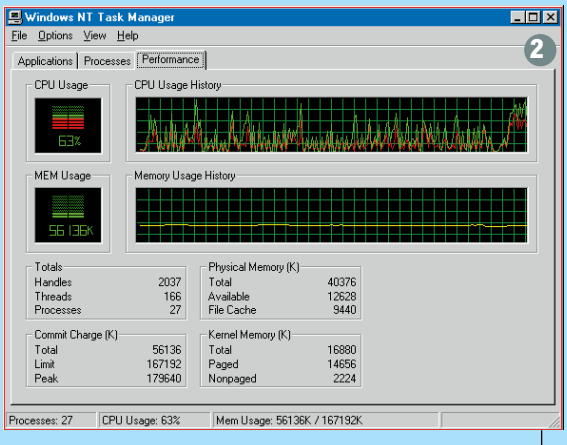
The foundation was then laid for a set of high-performance graphical extensions which together come under the name DirectX. DirectDraw is for rapid image composition such as that needed for animation and includes dynamic display resolution changing, DirectSound reduces application delay in mixing and playing audio, DirectInput allows responsive joystick handling, and DirectPlay is a set of APIs for multi-player games. Direct3D, for 3D graphics, is planned to follow.

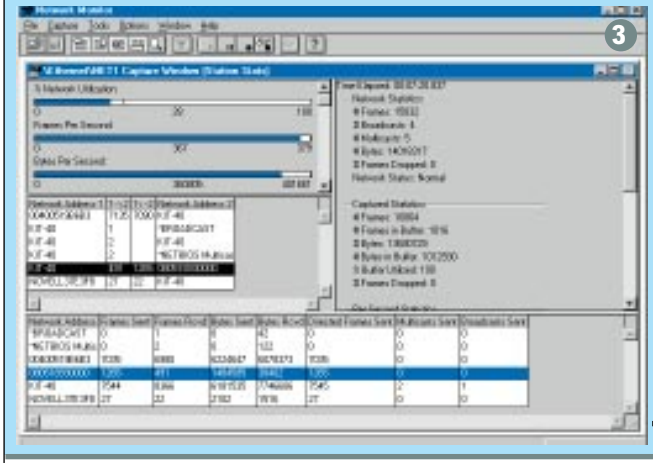
A demonstration of Doom, using the new DirectX APIs, to a gathering of journalists last April proved NT's new schizophrenic personality: a flexible, rugged business system and a nimble games platform. Some people may find this hard to swallow. Up to now, a

Summary of the main enhancements to Server

- Windows 95 user interface with much quicker graphics.
- Improved NetWare support in CSNW, GSNW and NDS.
- Enhanced Task Manager showing applications, tasks and system load.
- Diagnostics Tool with remote diagnostics.
- System Policy Editor to control system software configuration.
- Network Monitor with recorder for tracking and analysing network traffic.
- Administrative Wizards for new users.
- Improved performance in file and printer sharing and application serving.
- Enhanced Internet Server.
- Quicker workstation printing with rendering deferred to the server.
- Point to Point Tunnelling Protocol provides virtual private networks over public networks.
- RAS multilink channel aggregation — using multiple communications, links as one.
- Multi-protocol router for low-intensity applications.
- DNS server integrated with WINS.



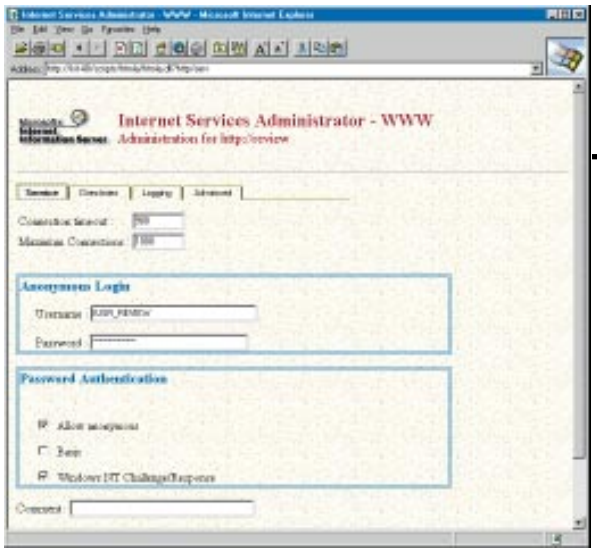




(1) *The new diagnostics tool shows you all you need to know about your system configuration*

(2) *Task Manager is now very much more functional and has a resource metre straight out of Thunderbirds*

(3) *The new Network Monitor is an excellent tool for rummaging around your packets*



A set of HTML forms provides browser access to manage IIS

computer system has either been good at business applications or designed for games; and surely you don't want to put a games system on your employees' desks? Games are just a memorable way of proving a point. More and more of tomorrow's business applications will be using animation and multimedia to present information, and without fast graphics, an operating system is never going to make it in an environment where video-conferencing is as commonplace as the telephone.

The Internet, too, will put heavy demands on desktop systems and NT is now well-placed to deal with these. Not only in the ways that information is presented, where new standards are still being thrashed out, but also in enabling people to publish their own information.

NT 4 Workstation comes with its own Internet Server designed for low-volume use and, with a name like "Peer Web Server", is clearly aimed at intranet and co-worker applications. The day will come when a corporate home page will feature a directory linking you to each employee's home page with their departmental and personal details. The framed family picture on the desk will be gone. Loved ones and pets will instead be presented on the home page.

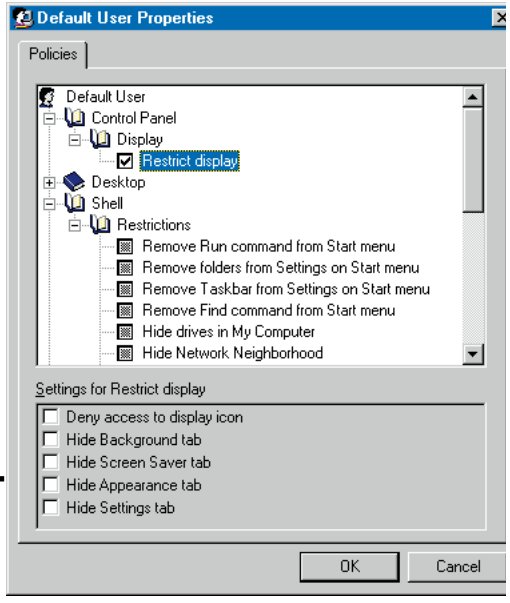
Server Edition

There has been a lot of attention paid to extending the capabilities of NT Server. It is now better at communicating, better at running application servers such as SQL and Internet, and easier to administer. It's also better at integration with NetWare.

NetWare has long been a thorn in the side of Microsoft, which believes that working more closely with NetWare is the best way to encroach upon its territory. Client and gateway services for NetWare have been extended to support NetWare Directory Services, including authentication to multiple NDS trees and NDS printing. Microsoft has surrendered to user pressure and has added logon script processing, even though it views the idea with horror in a modern networking environment, considering the same features are offered more tidily in other ways.

Speed improvements are claimed in many areas, one of which is a boost to the performance of file and printer sharing over high-speed 100Mb Ethernet links, although the optimisations listed would appear to be valid for the more common 10Mb links, too. They include reductions in the number of network frames transmitted by one third, the number of bytes written to disk by about a quarter, and an elimination of around half of the interrupts.

The responsiveness of application servers such as SQL and IIS has also been tweaked by adjustments in the way server applications are run. The simple expedient of giving applications longer timeslices makes better use of disk and processor caches, but there have been numerous improvements at other levels



The Policy Editor helps ensure a consistent user environment

Extended Batch Commands

ASSOC	Associates a file extension with a generic file type (not new, but see FTYPE).
CALL	Added ability to call subroutines in the current batch file.
CHDIR	You can change drive and path at once, and you no longer need to specify path names that contain spaces with quotes.
COLOR	Sets foreground and background colours for the whole console window.
FOR	Will loop issuing command strings against lists of files, directories and directory trees. It allows numerically controlled loops (equivalent to FOR I=1 TO 10 STEP 2, for example), plus reading and parsing the contents of text files, placing the contents into environment variables. You can also parse command output as though it were text from a file.
FTYPE	Works with ASSOC to associate commands with generic file types.
GOTO	Implicitly defined label :EOF allows return from subroutines and exit from batch files.
IF	Extended comparison operators include equality, inequality, less than (or equal) and greater than (or equal). Also, new test for existence of environment variable.
MKDIR	Intermediate directories in the path are created if necessary.
PATHEXT	Not a command but an environment variable. Lists all the file extensions to be considered as commands. By default: .com; .exe; .bat; .cmd. Use with ASSOC and FTYPE to add new scripting (batch) languages.
POPD	Releases drive letters assigned by PUSHD.
PUSHD	Accepts network paths and allocates spare drive letters as necessary.
SET	Now handles arithmetic expressions and substring extraction.

to reduce internal contention, make better use of hardware features such as Pentium optimisations, and improve scalability on multiprocessor systems.

Tests observed by the Transaction Processing Performance Council (an independent body whose membership reads like a directory of major computer companies and which was set up to oversee such tests) earlier this year compared SQL/Server 6.5 and a beta of NT/S 4.0 running on a Compaq ProLiant 4500 (4 x 133MHz Pentiums) with previous tests on a Sun SPARCCenter 2000E (20 x SuperSPARC II RISC/60MHz) running Informix Online 7.1 and Solaris 2.4. That's a four-processor system costing half a million dollars compared with a 20-processor system costing three and a half times as much. The results were comparable, with NT edging slightly ahead.

The full results and many similar test results can be found on http://www.tpc.org.

Pros and cons of NT and Windows 95

★ Win95 optimised for compatibility with old hardware and applications.
☆ NT optimised for performance, scalability and security.

★ Win95 runs MSDOS applications.
☆ NT runs most MSDOS applications.

★ Win95 runs Win16 and Win32 applications.
☆ NT runs Win16 and Win32 applications.

★ Win95 designed to fit in limited memory.
☆ NT better with more memory.

★ Win95 full plug and play support.
☆ NT cold swapping of PC Cards only.

★ Win95 runs MSDOS and Windows 3.1 device drivers.
☆ NT requires specially written device drivers.

★ Win95 has no recovery from system failures.
☆ NT automatic reboot after system failure.

★ Win95 runs on a single Intel x86 processor.
☆ NT runs on single or multiple Intel x86, MIPS, Alpha or PowerPC processors.

★ Win95 has advanced power management.
☆ NT has no advanced power management.

★ Win95 will have support for OpenGL graphics library.
☆ NT already has support for OpenGL graphics library.

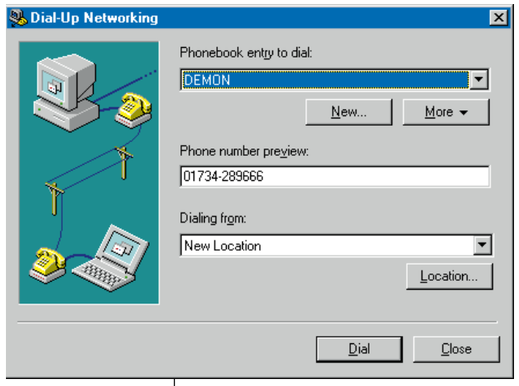
System Policy Editor

Corporates have long sought a way of enforcing a standard desktop and feature set on PCs throughout the organisation. They want to limit users' ability to run damaging or undesirable commands without hacking a system unduly, and make sure the company logo is superglued to the wallpaper.

The System Policy Editor controls the commands or options which a user has available, and also how their PC is configured. You are provided with two types of configuration: one for controlling the environment of users, the other for configuring PC systems. You might, for instance, have a PC that is configured for RAS dial-in and you can ensure that RAS is always running in the computer profile. You can also disable general users logging on to that system from interfering with the RAS configuration, while still allowing administrators the freedom to resolve problems.

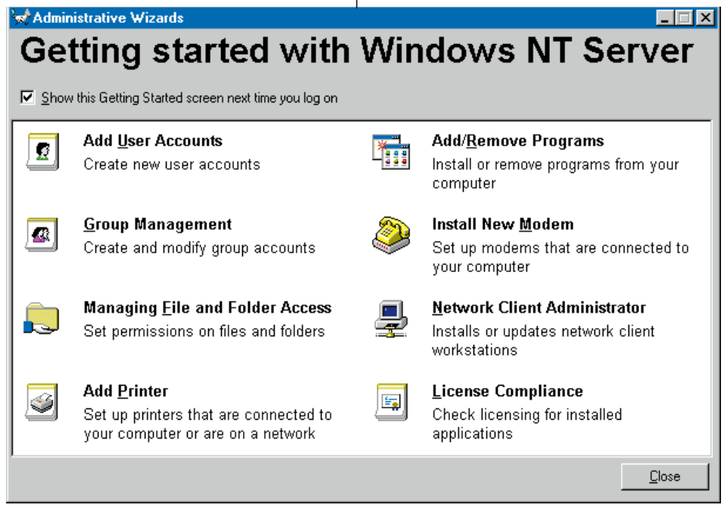
Administration wizards

Appeals from users for easier administration have been met with a set of wizards arranged on a central menu. In several cases, such as adding new printers, these do nothing more than take you to the new Windows 95-style wizard stored elsewhere. Managing users and sharing folders also get the simplistic treatment, but these are really just meant as guides for new users finding their way around. Experienced administrators may take a brief look out of curiosity and not bother with them again.



DUN is now more awkward to use and worse than dial-up networking on Win95. Can we have Rasphone back now, please?

Take a good look, because you're unlikely to bother with administration Wizards more than once



Enhanced Console Window

A decent batch language on NT is long overdue. A small set of extensions over the original DOS batch language appeared with the first release of NT but nothing has been done since, leaving NT well behind OS/2 and Unix. And while it was possible to bolt on external scripting languages such as Rexx and Perl, the integration was poor and not transparent.

A good batch language is important in a heavily automated environment and the lack of one often means resorting to programming languages, such as Visual Basic, to achieve simple objectives.

OS/2, Win95, NetWare, NT Server and NT Client, compared

Feature	OS/2 Warp Server	NetWare 4.1	Windows 95	NT Workstation 4.0	NT Server 4.0
Network protocols	TCP/IP, NetBEUI, IPX/SPX	TCP/IP, IPX/SPX, AppleTalk OSI - FTAM, SNA, Dec LAT	TCP/IP, NetBEUI, IPX/SPX	TCP/IP; NetBEUI; NWLink IPX/SPX; Appletalk PPTP; DLC	TCP/IP, NetBEUI, NWLink IPX/SPX, Appletalk, PPTP, DLC
Network clients	NetWare, DOS, Mac Windows 3.1, 95, NT, OS/2 UNIX	DOS, Mac, OS/2, Windows 95, NT, UNIX, Acorn Archimedes	Windows, NetWare	Windows, NetWare, DOS, Macintosh	Windows, NetWare, DOS
Domain Name Server	●	●	○	○	●
Internet Servers	○	FTP, HTTP, RCGI/CGI, TELNET, IP Routing, IP to IPX G/W	○	HTTP, FTP	HTTP, FTP, Gopher, Multi Protocol Router
DHCP server	●	●	○	○	●
File System Formats	HPFS, FAT	NetWare File System	FAT	NTFS, FAT, HPFS	NTFS, FAT, HPFS
Symetrical Multiprocessor support	○	Through OEM's	○	Up to 32 processors	Up to 32 processors
Plug 'n' Play	○	○	●	Cold Swap	Cold Swap
Processor Architecture	Intel x86	Intel x86	Intel x86	Intel x86, DEC Alpha, MIPS, PowerPC	Intel x86, DEC Alpha, MIPS, PowerPC
Remote Administration	●	●	●	●	●
Dial-up Access	●	●	●	●	●
Printing Protocol Translation	●	●	○	●	●
Workstation Application Support	●	○	●	●	●
Run Win16 Applications	●	○	●	●	●
Run Win32 Applications	Up to Win32S 1.25	○	●	●	●
Run OS/2 Applications	●	○	○	16-bit text mode only	16-bit text mode only
Run NLMs	○	●	○	○	○
Directory Services	●	●	No	●	●
Batch Languages	Rexx, BAT	Rexx & BAT	BAT, Rexx, Perl	BAT, Rexx, Perl, others	BAT, Rexx, Perl, others
GUI administration	●	●	●	●	●
Games platform	●	○	●	●	●
Task Management	●	●	●	●	●
Inter-process memory protection	●	Yes via Domain NLM	32-bit apps	●	●
File Compression	●	●	●	●	●
Preemptive Multitasking	●	Yes via Domain NLM	32-bit apps	●	●
Minimum RAM	8Mb	6Mb	8Mb	12Mb	16Mb
Max RAM	4Gb	4Gb	4Gb	4Gb	4Gb
Virtual Memory	●	○	●	●	●
Max file size	2Gb	4Gb	2Gb	17 billion Gb	17 billion Gb
Disk quotas	●	●	○	○	○
Security	C2 certifiable	C2 certifiable	○	C2 certifiable	C2 certifiable
Single Login to all Network resources	●	●	○	●	●
Diskless Workstation Boot	●	●	○	○	●
Auto Tuning & Dynamic changes on fly	●	●	○	○	○

KEY ● Yes ○ No

NT has tackled this shortcoming from two angles and with mixed success. Firstly, the command language of the console environment has been extended in numerous ways. Secondly, you can now add your own favourite scripting languages in a way that allows you to run the scripts by entering just the filename.

Compatibility considerations have restrained what might otherwise have been an extensive reworking of the original DOS command language. The results provide greater power and flexibility, but the syntax is so bizarre in places that the emergence of books with titles like "1001 Things You Never Knew You Could Do With Console Commands — Volume 20" are unfortunately inevitable.

A few of the more interesting extensions are summarised in the panel, "Extended Batch Commands" *(page 110)*, and the general handling of environment variables now allows substring extraction and substitution, plus the flexible manipulation of the components of file names and paths.

PCW Details

System Requirements

Windows NT Workstation: minimum 12Mb RAM and 90Mb hard disk space.
Windows NT Server: minimum 16Mb RAM and 120Mb hard disk space.
Both require at least double the amount of suggested disk space during installation, and the RISC version may need slightly more overall.

Price (not set at time of writing). Likely to be more or less the same as previous versions: Server £580 (plus VAT), Workstation £250 (plus VAT).

Gathering speed

As CD-ROM drives get faster and faster, Gordon Laing tests eight new machines, examines the technology and looks to the future with DVD-ROM.

Don't look now, it's drive time again. Everyone knows the computer industry moves quickly, but CD-ROM drives are verging on the ridiculous. Blink, and they'll have doubled in speed or halved in price again.

A few short years ago, the CD-ROM market was a leisurely place with single-speed drives costing a fair wedge of cash. A while later, the technical people discovered they could spin the disc at twice the speed, doubling the performance and resulting in the birth of the double-speed drive. Suddenly, just as double-speed drives were becoming a comfortable standard, the quad-speed drive arrived.

Quads heralded the arrival of Enhanced IDE (EIDE) as the means by which CD-ROM drives could be cheaply and easily connected to PCs. More importantly, the quads arrived at a price point fractionally above, and in some cases below, that of the double-speed drives only a month previously.

Not so long ago we blinked again and six-speed drives appeared, and now the inevitable surge of eight-speed drives has hit the *PCW* labs.

In this feature, *PCW* looks at eight eight-speed internal drives, seven of which had EIDE interfaces, leaving one lone representative of SCSI-2. We've put all the drives through our suite of CD-ROM drive tests, under both Windows 3.x and Windows 95. Along with comprehensive test results, we've got the theory behind CD-ROM, the performance issues, means of hardware connection, applications for these faster drives, and a brief glimpse into the near future of optical discs. Will they be faster than eight-speed drives, and will the fabled DVD render today's CD-ROM obsolete?

The theory

The first question is, "Eight times what, exactly?" To answer this, we must return to the birth of the compact disc, then a carrier of audio only. To store 70 minutes of digital audio, in the Red Book standard defined by Sony and Philips, required a 650Mb capacity

disc. It didn't take long to realise the potential of a cheaply-manufactured read-only disc with a capacity of 650Mb, and the CD-ROM was born. The first CD-ROM drives read the information at the same speed as an audio player, which, with error correction, meant 150Kb/sec, later to be known as single-speed.

While audio discs have to be read at single-speed, there is no limit for the CD-ROM. Indeed, the faster you get the data off, the better. Double-speed resulted in a sustained data transfer rate of 300Kb/sec, which quad doubled again to 600Kb/sec; and eight-speed doubles yet again to 1200Kb/sec, with six-speed sitting in-between at around 900Kb/sec. All these figures are theoretical maximums and refer only to sustained data transfers.

So that's all there is to it? Just spin faster and faster and reap the benefits? Unfortunately, random access times are still slow compared to hard disks, and as CD-ROM drives spin faster, they place greater strain on the processor. Some manufacturers have developed software drivers to help keep this under control.

Applications

It's easy to get carried away with the numbers game. Faster is usually better, but with CD-ROM drives this is not always the case. As proved in our results, the faster drives do place a greater strain on your processor, and in some cases a quad may prove to be a better overall performer than a six- or eight-speed drive.

Then there's the applications. What exactly do you need a faster CD-ROM drive for? Most multimedia titles are optimised for double or, at best, quad-speed drives. If video is recorded to play back in real time at a 300Kb/sec sustained transfer rate, anything faster than double-speed is unnecessary. In some cases, a faster drive may be able to read off the information quickly into a cache, from where it is subsequently played, freeing up the drive for further work. This is rare, however.

Pulling off large images from a PhotoCD would be a perfect application for a faster CD-ROM drive, but decompressing these images as they're read off the disc results in a performance ceiling of quad-speed. A faster drive won't open the images any quicker, though.

In fact, just about the only application which truly needs a fast sustained data transfer rate is copying sequential data straight onto a hard disk. In other words, installing software. A Windows 95, CorelDraw or Microsoft Office installation is a breeze using a fast CD-ROM drive, which is fantastic for computer software reviewers, but how often do you foresee yourself doing these installations?

Remember that fast CD-ROM drives are only fast for sustained data transfer, not random access. An ideal application for high sustained data transfer is high-quality digital video, recorded at a suitably high rate. MPEG-2 video, as implemented on forthcoming DVD video discs, requires a sustained data transfer of around 580Kb/sec, compared to MPEG-1's 170Kb/sec found on existing White Book VideoCDs. A standard 650Mb CD-ROM disc would last less than 20 minutes at those high rates and demand at least a quad-speed drive, so don't expect to see high-quality video on anything apart from DVD discs, which have a much higher capacity.

Making the connection

CD-ROM drives have three main connections on the back: power; audio out to your sound card; and the data interface. Today's standard CD-ROM drives have an IDE data interface, which in theory can be connected to the IDE controller found on virtually every PC.

The original IDE hard drive was designed for the AT bus. The IDE interface with its single channel could support two drives, and the later ATAPI specification allowed one of these to be an IDE CD-ROM drive. Unfortunately, in the excitement few bothered to notice that a CD-ROM drive sharing the same IDE channel as a hard drive would slow it down, particularly in Windows 3.x where the precious 32-bit access was lost.

The most popular solution is to connect the CD-ROM drive to a separate IDE channel. EIDE offers two channels, so pop your hard drive(s) on one and your CD-ROM drive on the other. Most new PCs feature EIDE on their motherboards, while owners of older PCs should look into buying a new EIDE controller card, preferably one which connects to a local bus VL or PCI slot.

SCSI CD-ROM drives require a SCSI controller card. Standard SCSI can support up to eight internal or external devices on its single data channel, one of which is the SCSI controller itself. SCSI handles multiple devices more effectively, particularly in a multitasking environment, and when coupled with a bus-mastering controller can significantly relieve the processor hit. Decent SCSI controllers aren't cheap, but those who desire the ultimate flexibility and performance should check out the Adaptec 2940UW PCI controller card, available for £200 (plus VAT) on the street.

The future

The cynics out there, myself included, will already be anticipating the next CD-ROM drive. Manufacturers had six-speed, eight-speed and probably faster drives ready as they were selling the first quads. Meanwhile, PC builders are so obsessed about beating their competition in the numbers game that they can't wait for the drive manufacturers to supply them faster hardware. As soon as one of the drive manufacturers falters under the pressure and supplies the new, faster drives, all the others must follow. Inevitably, many drive manufacturers get caught out with stacks of slower drives which the world suddenly isn't interested in buying. Many of the big names waited until they sold out of quads before manufacturing faster drives in volume, and several skipped six-speed entirely, waiting for eight to catch on.

The next step is 10- and 12-speed. You can assume the drive manufacturers already have one or the other ready for sale as soon as their eights are sold out, or as soon as one of the competition release theirs. It depends which comes first — it's a real game of dare. You can bet the next evolution will be ready in time for the Christmas rush.

Innovation checks in

By now you'll have realised that fast CD-ROM drives are very much a marketing game, with few real applications to support them and the possibility of an increasingly strained processor which is trying to keep up. There is, however, some innovation on the horizon.

Pioneer, first with quad-speed when most only had single, is skipping six- and eight-speed entirely, in favour of its new ten-speed technology. The really clever part is that the drive can operate not only in conventional CLV (constant linear velocity) mode, but also CAV (constant angular velocity) mode, like a hard disk. Reading a CD-ROM disc in CAV mode results in a drop of sustained data transfer rate towards the edge of the disk, but access times are considerably improved all over. Pioneer's model can be fixed to operate exclusively in either CAV or CLV mode, or to work in a mixed mode. We will do a full review of this drive when it becomes available, hopefully in the next few months.

Digital Versatile Disc (DVD) is almost upon us. After much squabbling between Sony/Philips and Toshiba, a standard has been just about set. DVD discs are the same physical size as current CDs but have a finer track and smaller pits, read by a finer wavelength laser. Each surface is capable of storing up to 4.7Gb, compared to the 650Mb of conventional CDs. There will be four varieties of DVD disc: single-sided with single layer offering 4.7Gb; single-sided dual layer; double-sided single layer with 9.4Gb; or doubled-sided with dual layers, extending capacity to a huge 18.8Gb.

The original CD's capacity was meant to be able to store around 70 minutes of 16-bit,

44.1kHz stereo digital audio running at around 170Kb/sec. DVD's nominal capacity of 4.7Gb will store 135 minutes of MPEG-2 digital video with a choice of audio tracks and subtitles: a whole film in decent-quality digital video on one side of a disc.

Clearly, DVD-ROM for computers is an exciting prospect, with high data capacity and a proposed sustained data transfer of 1350Kb/sec, which is equivalent to a nine-speed CD-ROM drive. DVD-ROM drives will be backwards compatible with CD-ROM discs, although CD-ROMs will probably be spun at DVD's nominal rate for video discs. This will result in sustained data transfer rates from conventional CD-ROM discs of around 500Kb/sec, which is somewhere between triple- and quad-speed.

In the long term, DVD-ROM drives will replace CD-ROM drives, but there are some difficulties already emerging. First, we understand that DVD-ROM drives will not be able to read current CD-Recordable discs, due to the shorter laser wavelength. Secondly, the first DVD-ROM drives probably won't read sequential data from current CD-ROM discs faster than quad-speed. This, coupled with the fact that the first DVD-ROM drives will cost around £400 compared to today's sub-£100 fast CD-ROM drives, will ensure that both drives will be used side-by-side for some time.

Winding down

Most of these drives are OEM products, only available to PC builders in large quantities. A couple are genuine off-the-shelf products, such as Goldstar, Aztech and Plextor, but in the past, availability of new, fast CD-ROM drives has been limited.

Then there's choice. Not only do they all look the same, but most of them perform just about the same, too. Under Windows 95, all IDE drives relied on Microsoft's built-in ATAPI driver and ended up performing almost identically. All but the Aztech turned out a respectable sustained data transfer rate of around 1200Kb/sec, as expected of a claimed eight-speed.

We were justifiably concerned about the processor hit. When spinning at eight-speed, all the IDE drives soaked up between 27 percent and 34 percent of the processor's resources. The only exception was Plextor's 8PLEX SCSI drive. Using a combination of an Adaptec bus-mastering controller and Plextor's own cunning driver, a processor hit of only 6.5 percent was recorded.

Under Windows 3.x the manufacturer's 16-bit drivers came into effect, with some bettering others. Wearnes came out worst in 3.x overall, but the company claimed better drivers would be shipping by the time you read this. The Aztech drive we tested was a disappointment, with an unusually slow sustained data transfer rate.

Overall performance winners are Goldstar, Hitachi, and Plextor, although it does cost around £280 (plus VAT). Looking through our adverts and in the shops at the beginning of June 1996 for typical street prices shows that the Goldstar, Aztech, Hitachi, and Creative (which didn't arrive in time to test) drives were available for between £85 and £99 (plus VAT). If you're in the shops, the drive to look out for first is the Goldstar, while SCSI users should save up and go straight for the Plextor.

How we did the tests

VNU European Labs uses Euromark 2.0 to test eight-speed CD-ROM drives. An IBM 90MHz PC with 16Mb of RAM was used under Windows 95 or Windows for Workgroups, using a dual-boot program. The ATAPI CD-ROM drives were set up on the secondary EIDE channel for optimum performance. SCSI drives were connected to an Adaptec 2940UW PCI-SCSI adaptor.

Under Windows 3.11, the tests replicate common CD-ROM drive usage. Euromark's Random Access test checks performance when searching across a disk, while the sustained transfer rate test uses larger files accessed sequentially. This gives an indication of performance for applications like desktop video. All these results are combined into a relative performance score.

Most drives are compatible with major standards like PhotoCD, CD-ROM XA, MPC2 and MPC3. To verify true compatibility, and to measure performance under Windows 95, we also run MPC3. These tests are based on NSTL Intermark technology.

Some drives now use internal cacheing to decrease access times and raise burst-mode transfer speeds. Many CD-ROM drives also perform error-checking within the software driver rather than in hardware. Both of these will influence the MPC3 validation, because none of the ATAPI drive manufacturers supplied Windows 95 drivers with the hardware. When the Windows hardware wizard installs a "generic driver", the performance can be artificially reduced. It is usually worth checking your manufacturer's Internet (FTP) site or BBS for the specific device's Windows 95 driver files, and installing it using the Have Disk option.

MPC 3 tests measure cached service time as well as CPU utilisation. Measuring CPU utilisation reveals how well DMA is being used, and the overhead of hardware vs. software error detection. The greater the overhead, the fewer cycles the processor has to service other tasks. Ideally, this figure should be as small as possible. Two MPC3 scores are presented: mean CPU load, and sustained transfer rate using large files.

Eight-speed CD-ROM drives will drop speed if data cannot be read reliably, so when reading well-worn CDs or those with errors, be aware that an eight-speed drive may not show a large performance gain over older drives.

Performance Results

PCW **Main Photograph** by David Whyte
133MHz PC Photography by Bruce Mackie
Screen Image by Andy Parker

133MHZ MULTIMEDIA PC'S

MORE FOR LESS

More for your money is the key here, as we drift inexorably towards the P133 entry-level standard. Dylan Armbrust tests nine multimedia PCs, to see what they put into the mix and how well it gels.

It's hard to believe that in January 1995 you could buy an ultra-high specced P120 PC for £2,549, and that was with only a 15in monitor. Today, we're looking at being able to buy a P133 multimedia PC for as little as £1,499 — a drop of £550! But that's not the only good part, because that £1,499 will now also get you a 17in monitor, speakers, a decent software suite and, most importantly, speed.

With the recent announcement of the Pentium 200MHz chip from Intel and the P200+ from Cyrix, a P133 might seem a bit behind the times. But for most new buyers in America it's the entry-level standard, and it's only a matter of months before that trend hits our side of the Atlantic. We haven't yet reached the level of the Japanese, who tend to opt for the P166 class of PC right from the start, but it's only a matter of time before we do.

For this group test we decided to push our normal spec up a bit to include a 17in monitor, to see just how much you can get. We also requested that all PCs have a CD-ROM drive, a 1Gb or more hard drive, a Level 2 cache, 16Mb of RAM, a sound card, and a graphics card with 2Mb of video RAM. We specifically left certain categories, like CD-ROM drives, open just to see how advanced and competitive the market is.

What you'll find is that standards are ever changing. The bundling of eight-speed CD-ROM drives and 128-bit graphics cards, and the use of EDO RAM, are now becoming the *de facto* standard. As well, you'll notice the first wave of PCs making use of the new Intel Triton II, 430FX and 430VX, chipset. And to add to the mix, you'll see the presence of the first Cyrix 6x86 P133+ based PC in a *PCW* group test.

To see who does well, with what, for exactly how much, from our 18 group test participants, read on. Be sure to check out the Features Table to see just what you can buy for your £1,499. You'll be surprised at just how much.

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APRICOT MS 540

It's been a long time since we've had an Apricot PC in our group tests, especially for a $36 billion a year company, so it was good to see what was new and exciting in the company's PC line.

The MS 540 is your consummate all-in-one multimedia PC. This desktop model was one of the smallest we encountered, but don't let its low profile deceive you: by PC standards, this was the best-looking case of the lot. The floppy and CD-ROM drives are discreetly hidden by a fold-down cover, but accessing the CD-ROM open/close button proved a bit awkward once the tray was extended, unless you have very thin fingers. At the rear were the standard serial and parallel ports, plus PS/2 ports for keyboard and mouse, and audio, video and joystick connectors.

The interior of the MS 540 was somewhat less elegant than its exterior and proves the old adage "beauty is only skin deep". Once the cover is removed, one is struck by the lack of space inside. All the expansion slots are stacked vertically from a riser-board that has three ISA, one PCI and one PCI/ISA slot. Amazingly, three of the four slots can handle a full-length card (we checked). The four SIMM slots are located under the power supply, so access is very difficult if you need to upgrade.

To make the most of a compact situation Apricot has used on-board video and sound chips, thus eliminating the need to occupy precious expansion slot space. The MS 540 uses the Cirrus Logic GD5436 chip with on-board VRAM for video, and a Creative Labs Vibra 16 chip for sound. Only a Dataflex fax-modem ISA card occupies one of the expansion slots.

Monitor
Apricot has included its own brand of monitor which, regrettably, disappoints. Its focus and full resolution capabilities are below par, but it does incorporate BNC and D-Sub connectors.

PCW Details

Price £2,719 excl VAT
Contact 0800 212427. Fax 0121 717 0132

Software Bundle MS Works 4.0, MS Money, CD-ROM games pack, educational CD-ROMs, and CompuServe trial.
Hardware Bundle DataFlex fax modem.
Warranty Terms One year on-site; extras via reseller.
Technical Support Via reseller.

Good Points Nice compact desktop, good bundle of software, respectable performance.
Bad Points Super-expensive; disappointing monitor.
Conclusion A well-assembled, well thought out PC design. Ideal for families who like lots of processing power — at a cost.

Scores	
Software Bundle	8
Build Quality	8
Warranty	6
Value	3

ARMARI eXPS-IIH MEDIA DSP

This small Middlesex company managed to take the coveted crown, *PCW*'s Editor's Choice, in our last group test, so it had a lot to live up to this time around. And it's fair to say that it maintained its tradition of putting together a well-assembled, fast-performing machine.

The PC itself comes in your average tower case with two spare forward-facing 5.25in expansion bays. The standard I/O ports occupy the rear, and a Keytronics keyboard with clickity-springy action, a Microsoft mouse and a small pair of Yamaha YST M15 speakers complete the peripherals.

When you turn on the PC, you find that Armari has kindly created desktop shortcuts to MS Works and CD-Sampler. In the company's usual tradition, it has partitioned the hard drive into a C and D drive, thus avoiding lost clusters that come with partitions over 1Gb, and leaving the CD-ROM drive to become your E drive. Armari has also loaded and enclosed the Trio Win95 Communications Suite for voice/fax/data and media player facilities.

Once inside, you'll find that Armari has changed some of its sub-system components. This time the company has included an IBM Media DSP ISA sound/modem/joystick card instead of a SoundBlaster AWE-32, to give added features but taking only one expansion slot. Armari has moved up to a Teac six-speed CD-ROM, but stuck with the Matrox Millenium graphics card and Quantum Fireball 1.2Gb hard drive. The motherboard is a Supermicro P55T2S with the new Triton II 430HX chipset. Remarkably, this motherboard had six SIMM slots that are able to upgrade to a massive 768Mb of RAM.

Performance-wise, the Armari didn't disappoint. It came in the top five on the VNU Labs Windows 95 test and it led the Doom2 list.

Monitor
Armari, a loyal user of Iiyama monitors, included the flat-screen Vision Master Pro 17. It's an excellent choice, with vibrant colour, crisp focus, and both BNC and D-Sub connectors.

PCW Details

Price £1,949 (excl VAT)
Contact 0181 810 7441. Fax 0181 810 5783

Software Bundle MS Works 4.0, Trio Win95 Communications Suite.
Hardware Bundle Yamaha YST M15 speakers.
Warranty Terms One year on-site next day service, with 2nd and 3rd year options.
Technical Support Tel/fax.

Good Points Well built, huge memory expansion capability, great performance.
Bad Points Speakers could be better.
Conclusion Definitely not a disappointment. This PC upholds Armari's strong reputation and it's worthy of praise.

Scores	
Software Bundle	6.5
Build Quality	7
Warranty	6.5
Value	7

AST BRAVO MS S133

The Bravo MS S133 desktop has a most corporate feel about it. Its shapely front exterior is a pleasure to look at but beauty is only skin, or in this situation, case deep. Sadly, its overall performance was disappointing. Even with the presence of the newer Intel 430HX chipset, it still trailed many of the older Triton FX-based PCs, particularly in the Windows 95 tests.

Another disappointment was the lack of any pre-loaded software, such as Microsoft Office or Lotus SmartSuite. All that the Bravo came with was Windows 95 and we couldn't find any backup software disks to go with it. This is perhaps excusable from a purely corporate point of view, but it's a bit of a shortcoming from a consumer or SoHo perspective.

AST has put some nice all-in-one design touches on the Bravo. All sound, video and standard I/O are integrated into the motherboard design. There is 16-bit sound via a Vibra 16s sound chip, and the video is handled by an ATI Mach 64VT chip with 1Mb of SGRAM (we did ask for 2Mb of video memory, but the Bravo MS 133 review PC could only come with 1Mb). The I/O consists of PS/2 connectors for mouse and keyboard, one parallel and two serial ports, plus audio out, microphone, and headphone jack.

The interior of the Bravo is fairly tight, which we expected for a desktop model, but AST has done a good job of leaving space for full-length expansion cards and the like. Expansion slots are a bit dear as only two ISA, one PCI and one shared PCI/ISA slots, all located on a riser board, are available. There are six SIMM slots, two of which are filled, leaving lots of room for upgrades.

Monitor

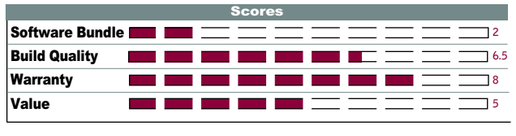
Monitors aren't normally included in a standard AST package, but AST's brand is quite solid. The AST Vision 7L monitor had excellent colour evenness and screen resolution.

PCW Details

Price RRP £1990 (excl VAT; about 10% cheaper via dealer)
Contact 0990 611611. Fax 01756 702889

Software Bundle Windows 95 or Windows for Workgroups, AST Command Centre voice recognition package.
Hardware Bundle Headphones with built-in mic.
Warranty Terms Three years BTB.
Technical Support Tel/fax.

Good Points Well laid out interior design, good warranty.
Bad Points Disappointing performance, lack of useful software, expensive for what you get.
Conclusion Good for the office but not the home, particularly if you want top-level performance.



ATLANTIC PRO 96 P133

This is Atlantic's third appearance in a *PCW* group test and we're now seeing a good degree of consistency. Its basic bundle has varied little over the past year and this consistency has again placed the company's performance near the top.

The Atlantic Pro comes in a stylised mini-tower with one 3.5in and one 5.25in forward-facing expansion bays. To the rear are two serial, one parallel, and a standard 5-pin keyboard port. A cheap "made in China" BTC keyboard, a pair of Trust Soundwave 40 15W speakers (one of the smallest speaker sets of the group) and Atlantic's own badged mouse make up the external peripherals.

Atlantic has included one of the stronger software suites of the group — Lotus SmartSuite, Corel Draw 4.0 and Quicken for Windows. This is a good start for anyone, because buying the software alone would cost you near to £300.

Inside the case you'll find the presence, as in the past, of a Soyo motherboard with Triton chipset. A cable and wire-free path exists to almost all the slots and memory, although the CELP socket holding the 256Kb of pipeline burst cache seems a bit close to the HDD. There's only room for two full-length ISA cards because the CPU fan acts as a block to one of the ISA slots.

The sub-system comes with many of the expected components for today's PC. We found the Pro 96 had an ATI Video Xpression PCI graphics card, Creative Labs SoundBlaster Vibra 16 ISA sound card, Aztec six-speed CD-ROM drive, and a 1Gb Western Digital Caviar hard disk drive. In terms of memory, Atlantic only filled two of the four SIMM slots with 16Mb of EDO RAM, which is always handy for upgrading to 32Mb without having to bin or sell your old RAM.

Monitor

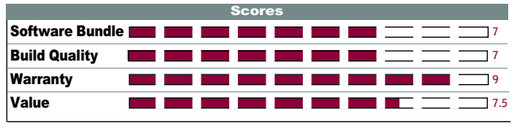
An ADI Microscan 5AP review monitor with fiddly controls and viewable area of 15.5in came with the Pro 96. It's MPR II and EPA compliant, has good colour and a vertical refresh range of 50-100MHz.

PCW Details

Price £1,509 (excl VAT)
Contact 01792 700002. Fax 01792 792888

Software Bundle Lotus SmartSuite, Corel 4.0, Quicken 3 for Windows.
Hardware Bundle Trust Soundwave 40 speakers.
Warranty Terms One year on-site; 4 years RTB.
Technical Support Tel/fax.

Good Points Strong software bundle, good performance, strong warranty.
Bad Points Cheap keyboard, fiddly controls on monitor.
Conclusion Consistent build quality and good pricing make Atlantic a respectable choice.



DAN DANTUM 95-133MHZ

Dan Technologies is one of those PC companies that seems to deliver quality every time. Our review machine arrived well packed and had all the disks and CD-ROMs for the software loaded onto the PC.

One example of Dan's good service shows up immediately when you boot the PC. The first things you notice are the Windows 95 shortcuts for the floppy, hard disk and CD-ROM drives, plus an application shortcut to MS Works 4.0. Very few of the other manufacturers have done this, and all in the *PCW* office agree that this is a good example of customer sensitivity.

Dan, like most other PC makers, has built the *de facto* standard PC configuration: a 1.2Gb Quantum Fireball hard drive, Matrox Millenium PCI graphics card and SoundBlaster AWE-32 ISA sound card comprise most of the sub-system. The company has gone up-spec with its bundling of a Goldstar GCD-R5880B eight-speed CD-ROM drive and we're sure it won't be long before you see the Dantum with ten-speeds. To complete the circle, Dan has bundled a Zoom Telephonics 28.8 fax modem.

Externally, the Dan shows a bit of style in case design. The interior is clear of cables and wires, and access to the expansion and SIMM slots is unobstructed. Two of the four SIMM slots are filled with 16Mb of EDO RAM but you can upgrade to a maximum of 128Mb. Dan has included 512Kb of pipeline burst cache but you can settle for 256Kb if so desired. The remaining two PCI and one ISA slots still give enough future expansion capability.

Last but not least, note the Dantum's performance results — it came in second place in the Windows 95 test charts.

Monitor

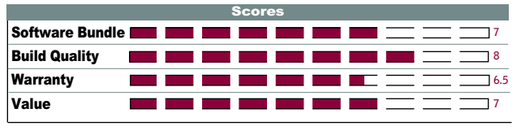
Dan uses the Iiyama Vision Master 17, which is just one step below the Vision Master Pro 17. Still, it has both BNC and D-Sub connectors, excellent screen regulation and clean, crisp colours.

PCW Details

Price £1,973 (excl VAT)
Contact 0181 830 1100. Fax: 0181 830 1122

Software Bundle MS Works 4.0, Lotus Organizer 2.1, MS Encarta 96, Games CD-ROM bundle.
Hardware Bundle DC-691 Computer Speakers.
Warranty Terms One year BTB; extended options.
Technical Support Tel/fax.

Good Points Nice little touches, like desktop shortcuts. Excellent performance.
Bad Points Nothing to complain about.
Conclusion Quality and performance at a slightly higher cost, but worth the premium.



DELL XPS P133

Dell has set itself apart from the group with the new XPS P133. This tower case model showed elegance and excellent design at almost every turn, but its performance didn't come up to our expectations. With Dell's use of the new Intel Tigershark motherboard, 430VX chipset and 168-pin SDRAM DIMMs (Dual Inline Memory Modules) even the competition thought it would do well, yet it only managed a place middle of the pack on test.

With the new tower design comes plenty of expansion capability, both inside and out. A pleasant surprise is the ease of accessing the interior — just remove one thumbscrew, pinch two latches and the side pops open. Brilliant. The interior landscape is almost clear of impediment and there's clear access to the CPU, DIMM slots and absolutely no worries exist for long expansion cards. The Western Digital hard drive rests flush and vertical to the front instead of occupying a standard 3.5in bay.

An eight-speed NEC CDR-1400A CD-ROM drive, Number Nine Motion 771 PCI graphics card and on-board Vibra 16S sound chip make up the sub-system. For an extra £50 you can opt for a SoundBlaster Pro AWE-32 ISA sound card instead of the Vibra chip. The XPS 133 is also the first PC we've seen that makes use of 168-pin DIMM modules, but there are only two memory slots, one of which was filled. Nonetheless, one can upgrade the RAM to a respectable 64Mb.

The Dell software package, containing MS Office Pro 95, is also respectable, but there were no system startup disks and utilities like those included in Gateway's box. Its pre-loaded Dell System Users Guide was a nice touch, however, and it helps make the Dell that much more user-friendly for the less PC-orientated.

Monitor

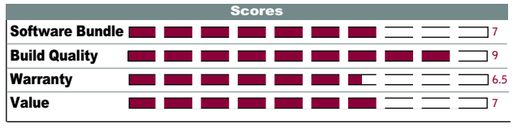
Dell ships its own badged version of the Nokia 447W. It may be a bit boxy, but it easily passed all the monitor tests and with no faults.

PCW Details

Price £1,599 (excl VAT)
Contact 01344 720000. Fax 01344 723 699

Software Bundle MS Office Pro 95.
Hardware Bundle Altec Lansing Multimedia AC531 speakers.
Warranty Terms One year BTB; options thereafter.
Technical Support Toll-free tel/fax.

Good Points Great design, superb build quality.
Bad Points Disappointing performance.
Conclusion A truly well-built machine, but all the new technology has failed to deliver.



DIGITAL CELEBRIS 133

Compared to Digital's appearance in our last group test, when it took a *PCW* Highly Commended award, the Celebris 133 was a huge let-down: the entire machine exuded a sad air of "too little, too late".

This desktop PC is very compact and utilitarian-looking. There are no forward expansion bays so forget about installing that tape backup. At the rear you'll find the usual I/O ports, video D-Sub connector and headphone, mic, speaker and line-out jacks. The power supply has a pass-through plug for the monitor.

Getting inside the Celibris was a nightmare. There are two butterfly knobs that rotate and, in theory, open the case: the reality is that the knobs are poorly made and can easily crack or break when they are turned, so preventing you from getting inside.

Once we *were* inside, things began to look better. In spite of its compact nature there's room enough for full-length expansion cards and no ribbon cable to bother with. The single PCI, ISA and shared PCI/ISA slots are situated on a riser card. Compared to most other PCs, this combination seems a bit slight, especially if one needs to use more than two PCI or ISA cards.

Digital has incorporated a simple, hinged, section that holds the power supply, CD-ROM and hard disk drives. To access the motherboard all you do is flip up the section, almost as you would open a door.

The sub-system is straightforward. A 1.2Gb Maxtor HDD, Toshiba four-speed CD-ROM drive, ESS 1688 on-board sound chip, and a Matrox Millenium video chip round off the whole. There are four SIMM slots, half of which are filled with EDO RAM.

Sadly, the Digital came in third from last in our benchmark tests. And, to add insult to injury, it comes with no extra software bundle save the operating system.

Monitor

The Digital FR-PCXBV-KA was also a disappointment. The colour proved to be a bit washed out, there was lots of moiré and the focus wasn't crisp.

PCW Details

Price RRP £2,812 (excl VAT)
Contact 0345 227228. Fax 0181 893 8889

Software Bundle Windows 95 or Windows for Workgroups 3.11.
Hardware Bundle None.
Warranty Terms First year on-site; second- and third-year BTB.
Technical Support Toll-free tel/fax.

Good Points Nice interior design. Decent warranty.
Bad Points Expensive. Hard to get in to. Sad performance.
Conclusion Much too expensive. If you want to settle for a third division PC, buy this.

Scores	
Software Bundle	0
Build Quality	6
Warranty	7
Value	2

EVESHAM VALE PLATINUM HX P133

The Vale Platinum is a beautiful PC. It was the first we came across in our group test to have the new Intel Triton 2 (or 430HX) chipset on the motherboard. The interior was the clearest of the lot, its performance was great, and it even looks nice.

The large tower case provides room for one 3.5in and three forward-facing 5.25in expansion bays, one of which is filled with a Panasonic CR-583 eight-speed CD-ROM drive. At the rear, there are PS/2 ports for keyboard and mouse and the usual complement of serial and parallel ports. Sadly, there isn't a pass-through power supply to plug the monitor into, although Evesham erroneously supplied us with one.

Like the Dell, getting into the case is easy and you have only to remove one panel, as opposed to the whole cover. Once inside, you'll find a well-designed setup. There are very few cables to contend with as most of the I/O ports are fixed into the motherboard design. In addition, there's 256Kb of on-board pipeline burst cache. There's plenty of room for full-length cards for the four PCI and three ISA slots. Two 8Mb EDO SIMMs occupy half the four SIMM slots. A whopping 2Gb Seagate ST32140A HDD, Matrox Millenium PCI graphics card and Creative Labs SoundBlaster AWE-32 ISA sound card round out the sub-system.

A set of Zy-fiz active 32W speakers with magnetic shielding, Ketronic keyboard and Microsoft mouse make up the peripherals. The software bundle consists of MS Works 4.0, plus a Microsoft Media pack of ten CD-ROMs.

The overall performance of the Evesham was impressive. It came in fourth on the VNU Labs Windows 95 benchmark test and was impressive in our CorelDraw and Doom2 tests.

Monitor

Shame on Evesham for supplying us with this monitor! Its fuzzy image and poor, uneven colour, together with poor line resolution and sad screen regulation, let the side down.

PCW Details

Price £1,789 (excl VAT)
Contact 01386 765500. Fax 01386 765354

Software Bundle Windows 95, MS Media Pack with MS Works 4.0.
Hardware Bundle Zydec Zy-Fiz 32W speakers.
Warranty Terms One year on-site; options thereafter.
Technical Support Tel/fax.

Good Points An outstanding PC with excellent performance across the board.
Bad Points The monitor — ask for a different make.
Conclusion Evesham's build quality, plus the use of the Triton II chipset, shows up in performance. But why do they cheap-out on the monitor?

Scores	
Software Bundle	6
Build Quality	8.5
Warranty	6.5
Value	6.5

GATEWAY 2000 PS133

Once again, Gateway lives up to its very American reputation of producing big PCs. The P5-133 we looked at, measuring 16.5 x 17 x 7ins, has to be the mother of all desktops. But if you don't have the deskspace for this beast, you can always place it vertically on the floor as Gateway has included little stabilising feet on all four sides.

With size comes space; especially expansion space. There are two, free, front-facing 5.25in expansion bays but no extra 3.5in bays — not that you really need it. The port configuration at the rear comes with PS/2 connectors for mouse and keyboard, one parallel and two serial ports.

The inside of the case was not as clear as we've found on previous Gateway PCs. The ribbon cabling and wires weren't strapped or clipped together in the manner of many other PCs we looked at. There's space aplenty for any full-length expansion cards (and almost anything else you can think of), three PCI, two ISA and one shared PCI/ISA slots. Our review model's sub-system included a 1.2Gb Western Digital Caviar 21200 HDD, Ensonique Viva sound card and Matrox Millenium graphics card. Regrettably, Gateway failed on its quality control regarding the Matrox card as there were no screw attachments on the blanking plate for securing the monitor cable.

Kudos must be awarded to the P5-133 on its performance. It comfortably lead the way in the important VNU Labs Windows 95 benchmark test, scoring a massive 77 points higher than the IBM Aptiva. What's more remarkable is that it came in ahead of the Dell (which had the new Intel 430VX chipset and DIMM modules) using the older Intel Triton FX chipset — an impressive feat for any PC, let alone the Gateway.

Monitor

The Vivitron 1776 was a bit disappointing. In our monitor tests we found the resolution and focus wasn't crisp, and the colour and contrast were a bit washed out.

PCW Details

Price £1,469 (excl VAT)
Contact 0800 552000. Fax 00 353 1 8482022

Software Bundle MS Office Pro, Encarta 96.
Hardware Bundle Altec Lansing multimedia speakers with sub-woofer.
Warranty Terms One year on-site; two years BTB.
Technical Support Toll-free tel/fax

Good Points Outstanding performance. Tons of interior space for expansion cards. Decent software bundle.
Bad Points Poor quality control on the Matrox card. Weak monitor.
Conclusion A real hot-rod of a PC, at a good price. Pity about the monitor.

Scores

Software Bundle	7
Build Quality	6
Warranty	7.5
Value	7.5

IBM APTIVA

This IBM Aptiva is like an old, sick, family animal: it's had its day and it just can't cope any more, so the kindest thing is to put it down — and that's precisely how we felt about this review model.

The tall case reminds one of 1960's brutalist architecture: all function, no style. The front has two free 5.25in expansion bays with a sliding cover, if you ever feel the need to cover them. At the rear, one finds the usual array of serial, parallel and PS/2 ports. There's also a fixed D-Sub video connector which is part of the motherboard I/O. The keyboard is solid, with a good action, but it doesn't have any Windows keys on it.

Getting inside is relatively easy. All you do is undo two screws, pull on the mother of all handles and, hey presto! the case slips off. The interior assembly is shockingly poor. Wires and ribbon cable overflow everywhere. The expansion slots are fixed on a riser stemming from the motherboard. There's a meagre two PCI slots, one of which is shared, to an excessive five ISA slots. All four SIMM slots are filled with 4Mb EDO RAM modules, preventing easy RAM upgrades, and there are two CELP sockets, one of which is filled with 256Kb of cache (which we had to request after we'd received the machine).

The sub-system is comprised of an IBM CRMC-FX400C3 four-speed CD-ROM drive (one of the few four-speeds in the group), an IBM DJAA-31700 1.7 Gb HDD, IBM MWAV modem/sound card and on-board Trident TGUI 9680 video controller with only 1Mb of VRAM (IBM wasn't able to supply us with 2Mb VRAM). Incredibly, the Aptiva performed about four times slower on the Corel test compared with the average, even though we were forced to run it in 8-bit colour instead of the required 16-bit colour.

Monitor

The Aptiva came with an IBM G70 17in monitor but has a viewable area of only 15.5ins. On the plus side, the colour was good and it has the whole range of image controls.

PCW Details

Price £2,358 (excl VAT)
Contact 0990 727272. Fax 0990 727272

Software Bundle Lotus SmartSuite 96, large multimedia games bundle, MS Works 4.0, and Total Image Video MPEG.
Hardware Bundle Sound Works speaker system by Henry Kloss with sub-woofer and microphone.
Warranty Terms One year parts and labour, RTB.
Technical Support Tel/fax.

Good Points Er… the monitor. And, er… it has some good software.
Bad Points Where do we begin?
Conclusion Behind the times, big time. IBM's only chance is to give them away.

Scores

Software Bundle	6.5
Build Quality	2
Warranty	6
Value	3

MESH ELITE 133 PROFESSIONAL

The Mesh was one of the few PCs that had a little bit of character on the outside as well as being one of the few desktop models in the group test. Its performance was impressive, especially in the Doom2 and Corel tests where it was placed in the top four. This mostly has to do with the presence of the new Intel Triton II chipset and fast sub-system components.

This desktop model has two 3.5in and two 5.25in forward expansion bays — about the same as most of the towers in the group. As an extra touch Mesh has added some (surprise!) black mesh on the corners of the PC. At the rear you'll find the standard serial/parallel/keyboard ports as well as a pass-through power supply for the monitor.

Internally, the Mesh is a bit of a let-down. Cramped quarters with bird's-nest wiring concentrated over the SIMM slots makes access difficult, and the position of the CPU could make the use of full-length PCI cards problematic. On the plus side, the Mesh OEM P55/512 motherboard incorporates the new Intel 430VX chipset. With three PCI, two ISA and one shared PCI/ISA slots, it would be no problem to add extra functionality.

The Elite comes with a 1Gb Quantum Fireball HDD, ATI Mirage 64 PCI graphics card, Creative Labs SoundBlaster AWE-32, and Toshiba XM-5522 six-speed CD-ROM drive. Mesh has also only used up two of the four SIMM slots, which is nice as it allows a hassle-free doubling of RAM if desired. On the software side, Mesh gives the user the choice of Windows 95 or Windows 3.1x as well as MS Works 4.0 or Lotus SmartSuite 96. Either way, the user will get off to a good start.

Monitor

Absolutely no unkind words here for Mesh's choice of monitor. The ADI Microscan 5EP provides all adjustment functions, excellent colour, both BNC and HD-15 connectors, and has rock solid screen regulation. Literally a top choice.

PCW Details

Price £1,499 (excl VAT)
Contact 0181 452 1111. Fax 0181 208 4493

Software Bundle Windows 95, MS Works 4.0 or Lotus SmartSuite 96 (customer's choice), plus assorted multimedia CD-ROMs.
Hardware Bundle Altec Lansing AC55 speakers.
Warranty Terms One year on-site, with multi-year upgrade options.
Technical Support Telephone call-back/fax.

Good Points It's fast, has a good software bundle and includes a top-quality monitor.
Bad Points Cramped and slightly messy interior.
Conclusion A well-built, high-performing PC with quality peripherals.

Scores	
Software Bundle	6.5
Build Quality	7
Warranty	6.5
Value	8

MJN BESTBUY SYSTEMS

From the minute we unpacked it, we knew things weren't boding well for the MJN. The first black mark came when we turned on the PC and discovered that Windows 95 hadn't been completely installed. It still had to go through the end phase of installation and it prompted us to enter a serial number. This is just sloppy and there's no excuse.

The exterior is a slightly stylised plastic case. To the front are three front-facing 5.25in bays, one of which holds a Teac CD-56E six-speed CD-ROM drive. The rear has the usual serial, parallel and keyboard connectors. Uniquely, MJN has bundled a Superhighway 28.8 external modem which leaves slots open for other upgrade cards inside.

On screen, the software bundle looked impressive. There was Lotus SmartSuite 96, GSP Design Works, Pacioli 2000 (accounting package), shareware games, BodyWorks, and more. However, MJN didn't enclose the actual software disks or CD-ROMs for half the software, including Lotus Smart Suite. Again, more sloppiness and another black mark.

Once we got inside the machine, things looked a bit better. Half of the four SIMM slots were filled, leaving room for upgrading. There was 512Kb of on-board pipeline burst cache, and the DTK motherboard had the new Intel Triton II (430HX) chipset. MJN has veered from the usual SoundBlaster path in its use of an Orchid NuSound ISA sound card, but it went a bit over the top with its inclusion of a Matrox Millenium graphics card with 4Mb of WRAM (we wanted 2Mb, but they only package 4Mb cards). A 2Gb Seagate ST32140A hard disk drive, locked away inaccessibly under the power supply, completed the sub-system.

Despite its short comings, the MJN did manage very respectable performances in all of the benchmark tests.

Monitor

The CTX Pro Scan 1765D is an adequate monitor, but it had slightly poor focus and the colour was less rich than many other monitors.

PCW Details

Price £1,629 (excl VAT)
Contact 01282 777555. Fax 01282 770 844

Software Bundle Lotus SmartSuite 96, GST Pressworks, shareware games CD-ROM, and more.
Hardware Bundle QuickShot joystick, Sound Force 600 speakers.
Warranty Terms One year RTB, options.
Technical Support Tel/fax.

Good Points Extra goodies like joystick and external modem. Reasonable performance.
Bad Points Poor software installation and sloppy packing.
Conclusion Bad vibes emanate from this PC, so we'd pass on this one.

Scores	
Software Bundle	6.5
Build Quality	6
Warranty	6
Value	5.5

OLYMPIAN EVOLUTION 2000/133MM

This small company has moved forward over the past year and is now positioning itself to go head to head with the high-end OEMs, like Red Box, and this is reflected in the Evolution 2000. The plain, solid case is symbolic of the Evolution 2000 itself. It wasn't the fastest-performing PC in our group, but the build and bundle reflect quality.

There are two free forward-facing 5.25in and one 3.5in bays, ample for any device upgrades. At the rear you'll find one 9-pin and one 25-pin serial ports, one parallel port, and a standard 5-pin keyboard plug-in.

The interior was very clear and showed a sense of care about access and expansion. There was plenty of room for full-length PCI or ISA cards, although access to the 5.25in bays was a bit tight. There are four SIMM slots, two of which were filled with 16Mb of EDO RAM ,and there's no obstruction getting to them. Olympian has used a TMC motherboard with 512Kb of on-board pipeline burst cache, which is ideal for systems that use 32Mb of RAM or above, but it doesn't hurt those with any less.

The sub-system consists of a Mitsumi FX-600 six-speed CD-ROM drive, Quantum Fireball 1.2Gb HDD, Creative Labs SoundBlaster Pro 16 ISA sound card and Matrox Millenium PCI graphics card. The inclusion of the six-speed CD-ROM surprised and disappointed us, as the trend for the high-end OEMs, as well as the Gateways and Dells, has moved to eight-speeds.

On the software side, the Evolution 2000 comes with Lotus SmartSuite 96, Corel 4.0, Quicken 3.0, Adobe Acrobat 2.0 and PFS Windows Works. This is a strong selection, as SmartSuite 96 and Corel 4.0 combined retail for about £220.

Monitor

An ADI Microscan 5V comes with the PC and it provides good colour, a complete set of monitor adjustment features, and is EnergyStar and TCO compliant.

PCW Details

Price £2,214 (excl VAT)
Contact 0181 880 4222. Fax 0181 880 4223

Software Bundle Windows 95, Lotus SmartSuite 96, Corel 4.0, Quicken 3.0, PFS Windows Works, Adobe Acrobat 2.0.
Hardware Bundle Active 75 stereo speakers.
Warranty Terms One year on-site (parts and labour), lifetime RTB (labour only).
Technical Support Tel/fax.

Good Points It's well built and contains quality components.
Bad Points Performance wasn't as fast as we expected, and it's a bit costly.
Conclusion The Evolution doesn't have all the bells and whistles. but it does exude quality and reliability.

Scores	
Software Bundle	7
Build Quality	8
Warranty	7
Value	7

PC SCIENCE MULTIMEDIA PRO

The Multimedia Pro comes from our new friends in the north, PC Science. This Yorkshire-based company was formed only a year ago but haa expanded over fifteen-fold during this time. The bulk of its business is the home/family multimedia PC market and it shows with this bundle. Not only does PC Science bundle a "Treasure Chest" of 31 CD-ROMs ranging from Family Doctor to Winfax Lite, it also includes a QuickShot joystick, general-purpose microphone and Trust 3D Sound speakers.

The PC itself comes in a sturdy but standard-looking large tower case. There's an extra forward-facing 3.5in and two 5.25in bays, one of which is occupied by an Aztec CDA868 eight-speed CD-ROM drive. To the rear you'll find the standard two serial, one parallel and keyboard ports. Sadly, PC Science has bundled the Multimedia Pro with a rather light and tinny Windows keyboard from Acer.

Upon opening the PC we found the interior clear and accessible. There are the expected four SIMM slots but all are filled with RAM, which is disappointing, and a bit cheeky, because it forces the buyer to purchase a whole new set SIMMs if they want to expand their RAM. The 1.7Gb IBM DJAA-31700 HD occupies one of the three 5.25in bays and it's the only PC in the group that does this. A Matrox Millenium graphics card is located in one of the three PCI slots, while sound, joystick and modem facilities are handled by an IBM Sound Miracle 28.8 ISA card.

In the end, the Multimedia Pro is the consumate family multimedia PC. It has plenty of accessories as well as software, but the overall quality is average yet affordable. Exactly what most people want.

Monitor

The Daewoo monitor disappointed. It has a viewable area of 16in but no pincushion or barrel controls, the colour was faded, and our tests uncovered poor screen regulation.

PCW Details

Price £1,499 (excl VAT)
Contact 01423 323386. Fax 01423 323370

Software Bundle Windows 95, plus the 31 CD-ROM "Treasure Chest" of games, dictionaries, CAD packages...
Hardware Bundle Trust 3D Sound speakers, QuickShot Sky Hawk joystick, and microphone.
Warranty Terms One year on-site (upgradable).
Technical Support Tel/fax.

Good Points Well built, with the largest amount of hardware and software extras of the lot.
Bad Points Disappointing monitor quality, and RAM upgrade is limited by its use of four 4Mb SIMMs.
Conclusion The consummate budget family multimedia PC, with lots of quantity but a little shy on quality.

Scores	
Software Bundle	7
Build Quality	7
Warranty	6.5
Value	6.5

RED BOX CP 133+PRO

This PC was a little like the black duckling of the group. It was the odd one out, with a Cyrix 6x86 processor, VideoLogic GrafixStar 600 128-bit graphics card and huge "midi-tower" case. But after running our tests and opening up the box, this little duckling turned into a swan.

From the outside, the Red Box exudes a sense of expansion, so you'll need a lot of under-desk space to accommodate it. There are three free 5.25in and one 3.5in forward expansion bays. At the rear are two serial, one parallel, PS/2 mouse, and standard 5-pin keyboard ports. A solid, slightly curved Keytronic keyboard, Microsoft mouse and Altec Lansing S31X speakers round out the external offerings.

The interior is quite clear, and you instantly notice signs of innovation and attention to detail. You can easily fit three full-length ISA cards plus a good mix of PCI cards in the three PCI, four ISA and one PCI/ISA slots. The Tyan SI 562 motherboard comes with a Triton 430HX chipset which allows the PC to make use of all eight SIMM slots for a total RAM capability of 512Mb. The sub-system is made up of a fast 1.2Gb Quantum Fireball hard drive, VideoLogic GrafixStar 600 128-bit graphics card and SoundBlaster Pro AWE-32 sound card.

The CP 133+ Pro was one of only three PCs in the group to come with the Microsoft Office Pro 95 application suite. This adds a certain cachet, and value, to the PC if you consider that a full version retails for £425.

With Red Box's innovative approach came excellent test results. In the key VNU Labs Windows 95 test, the Red Box came in third overall, and it wasn't far behind at that, which just goes to show that a Cyrix 6x86 CPU packs a lot of processing power.

Monitor

Our Red Box review machine came with the flat-screened Iiyama VisionMaster 17. Our tests showed sharp focus, and good colour evenness and screen resolution.

PCW Details

Price £1,899 (excl VAT)
Contact 01480 405541. Fax 01480 471687

Software Bundle MS Office Pro 95.
Hardware Bundle Altec Lansing S31X speakers.
Warranty Terms One year on-site plus extended options.
Technical Support Tel/fax.

Good Points Excellent Windows 95 performance. Comes with full version of MS Office.
Bad Points None to speak of.
Conclusion This PC is meant to perform, and the attention paid to leading-edge design shows through.

Scores	
Software Bundle	8
Build Quality	8
Warranty	6.5
Value	8

VIGLEN POWER 133

With every group test we do, we find there are a handful of PC makers that remain consistent in their quality: Viglen is one of them. From the time we open the neatly-packed boxes to the moment we enter the case, we find that Viglen shows care in its assembly.

Externally, the Viglen is a PC like any other. It comes in a standard midi-tower case that has two free 5.25in and one 3.5in forward-facing expansion bays. At the rear exist the expected I/O ports as well as pass-through power socket for monitor plug-in.

Internally, the quality of assembly comes through. All cables and chords provide no obstruction. Viglen is using an Intel Endeavour motherboard with a standard Triton FX chipset, so the 256Kb of pipeline burst cache is in a CELP socket instead of on-board like some of the newer models. There are four SIMM slots, two of which are filled with 16Mb of EDO RAM; getting to them is another matter, however, as they are directly under the hard disk caddy. One will need to be patient and have flexible hands for any troubleshooting.

With three PCI, two ISA and one PCI/ISA slot there's lots of room for expansion cards. Viglen has cleverly managed to free up an ISA slot with its use of the Creative Technologies Vibra 16s integrated on-board 16-bit sound chip. An ATI Video Xpression graphics card, DataFlex fax modem, 1Gb Seagate hard drive and Teac CD-56E six-speed CD-ROM drive complete the sub-system.

Performance-wise, the Viglen did extremely well on the Corel and Doom2 tests but produced only a middling score on the VNU Labs Windows 95 test.

Monitor

Viglen sent us an Envy 17 17in monitor that incorporated all of the essential controls such as degauss, barrel and pincushion. Regrettably, its viewable area tied with that of the IBM Aptiva, at only 15.5in.

PCW Details

Price £1,717 (excl VAT)
Contact 0181 758 7000. Fax 0181 758 7080

Software Bundle MS Works 95, Win95 Multimedia, Cyberworks.
Hardware Bundle Sound Force 600 speakers, microphone.
Warranty Terms One year collect and return, options.
Technical Support Tel/fax.

Good Points Well built, with respectable performance.
Bad Points SIMMs difficult to access.
Conclusion Viglen's quality shows through, yet again. All they need to do is boost performance and they'll be top.

Scores	
Software Bundle	6.5
Build Quality	8.5
Warranty	6.5
Value	7

WATFORD ARIES PRO MEDIA P133

Like PC Science, this is the first time Watford has been involved in a *PCW* group test so we weren't sure what to expect. Watford, now based in Luton, has actually been around for a long time and its £33 million annual turnover proves that the company is a player in the market.

Externally, the Aries looks fine. The mini-tower case is solid, as expected, with two 5.25in and one 3.5in free front-facing expansion bays. A pass-through power supply and standard configuration of I/O ports complete the outside package.

But Watford's time in the industry and large turnover don't seem to show themselves in the assembly or performance of the PC sent to us. When we opened up the case, we were disappointed with what we found. Our first observation was the incredibly tight nature of the interior. Ribbon cable and wiring flowed freely out over the motherboard, showing no care in folding or strapping cables for access. Getting to the SIMM slots was like hacking through a jungle of wires. We found there was only one ISA slot out of all the ISA and PCI slots that could take a full-length card, because of the position of the CPU.

On the plus side, Watford has bundled a Pansonic CDA 868 eight-speed CD-ROM drive, Conner 1.2 Gb HDD, VideoLogic GrafixStar 700 PCI graphics card, Xlink 28.8 fax modem and Creative Labs SoundBlaster 16 ISA sound card. Only two of the four SIMM slots are filled, and if you can get to them, expanding the RAM is easy.

Nothing in terms of application suites or multimedia titles, except Delrina 4 in 1 comms, are included. Only a few throwaway free trial on-line services disks are to be found, but then, they can be found on the cover of any computer magazine.

Monitor

A Panasonic TX-D1734 with a 16in viewable area was included with the Aries. It's a good monitor with all the requisite controls, good colour, and it's TCO '92 and EnergyStar compliant.

PCW Details

Price £1,626 (excl VAT)
Contact 01582 745555. Fax 01582 488588

Software Bundle Win95 tutorial, Delrina 4 in 1, Internet "Get Connected" tutorial.
Hardware Bundle Juster SP800 80W speakers.
Warranty Terms One year on-site (parts/labour), five-year RTB (labour).
Technical Support Tel/fax.

Good Points Better warranty conditions than most, good monitor.
Bad Points Birds nest-like interior. Very poor performance.
Conclusion Nice veneer, but comes up short in performance and build quality.

Scores	
Software Bundle	2
Build Quality	5
Warranty	7.5
Value	5

ZENITH Z-STATION GT P133 1600C

The Z-Station is similar in nature to the Digital Celebris, especially in its corporate feel. Even though Zenith is now owned by Packard Bell, renowned for its consumer line of PCs, the Z-Station is really meant for a City office desk. Like the Digital, it is expensive, slow, and comes with very little extra software or hardware.

There's not much to distinguish this desktop model from many other PCs out there. Our review model came with two 5.25in forward-facing expansion bays, one of which held a Toshiba XM 5302B four-speed CD-ROM drive. To the rear, the I/O port configuration is slightly different from the rest. There are PS/2 connectors for keyboard and mouse, a parallel port and video D-Sub connector, but there is only one serial port built-in.

The sub-system consists of a Western Digital 1.6Gb hard drive, Creative Labs Vibra 16 ISA sound card, and the ATI Mach 64 video chipset. 256Kb of pipeline burst cache occupies the CELP socket. There is 16Mb of Fast Page Mode (FPM) RAM fixed right on to the motherboard, leaving the remaining four SIMM slots vacant for upgrading. Zenith has opted to use the Opti Viper, instead of Triton, chipset so this, combined with the use of the FPM RAM, had a visible effect on the Z-Station's performance.

The overall build quality of the Zenith is poor. The interior is tight, with ribbon cable and wire filling the gaps between the expansion cards. Access to the SIMM slots is near impossible without removing the various disk drives or motherboard. And, to top it all, of some of the components weren't properly connected. We found that the CD-ROM wasn't connected when we initially booted the PC and were forced to open up the PC from the word go. All in all, this is pretty sloppy assembly.

Monitor

Zenith has bundled a reasonable monitor. The ADS ZCM-1750-XT has excellent grey-scaling, screen regulation and crisp focus. No real complaint with this choice.

PCW Details

Price £2,360 (excel VAT)
Contact 01756 702800. Fax 01756702889

Software Bundle Norton Anti-Virus, Norton Navigator, and Netscape Navigator
Hardware Bundle None
Warranty Terms One year on-site, second and third year BTB
Technical Support Tel/fax

Good Points Nice monitor.
Bad Points Sloppy assembly, expensive, and they forgot to include the backup software in shipping box.
Conclusion Third-rate performance and build quality. Look elsewhere.

Scores	
Software Bundle	2
Build Quality	2
Warranty	7
Value	2

Editor's Choice

Selecting the Editor's Choice is always difficult, but it seemed more so with this group test because of the number of high-performance and reasonably-priced machines. Also, with the proliferation of standardised components it can, at times, be difficult to tell PCs apart. In this group test, and the previous one, components such as the Matrox Millenium graphics card and Quantum Fireball hard drives were ubiquitous. Only one PC came without EDO RAM, so it's fair to say that EDO RAM is now standard.

The emergence of the new Intel Triton II chipsets, particularly the 430HX, make their mark on the performance chart too. And fast six- and eight-speed CD-ROMs were found on all but three PCs, and by the time this is published, eight-speed CD-ROMs will be carried by about 70 percent of the PCs.

The first Highly Commended award goes to the Cyrix P133+ based Red Box. It isn't the cheapest PC, but it performs well. The build quality and inclusion of top-of-the-line components demonstrate an innovative approach. The Microsoft Office Pro 95 software bundle is also a strong draw, particularly considering its retail value alone.

Our second Highly Commended award is taken by the Evesham. If you ignore the EcoScan monitor, what you'll find is a well-built and well-designed PC. The whole design, from case to motherboard, plus the 2Gb Seagate hard drive, impressed us. Its performance ranked in the top five on the Doom2 and Windows 95 tests.

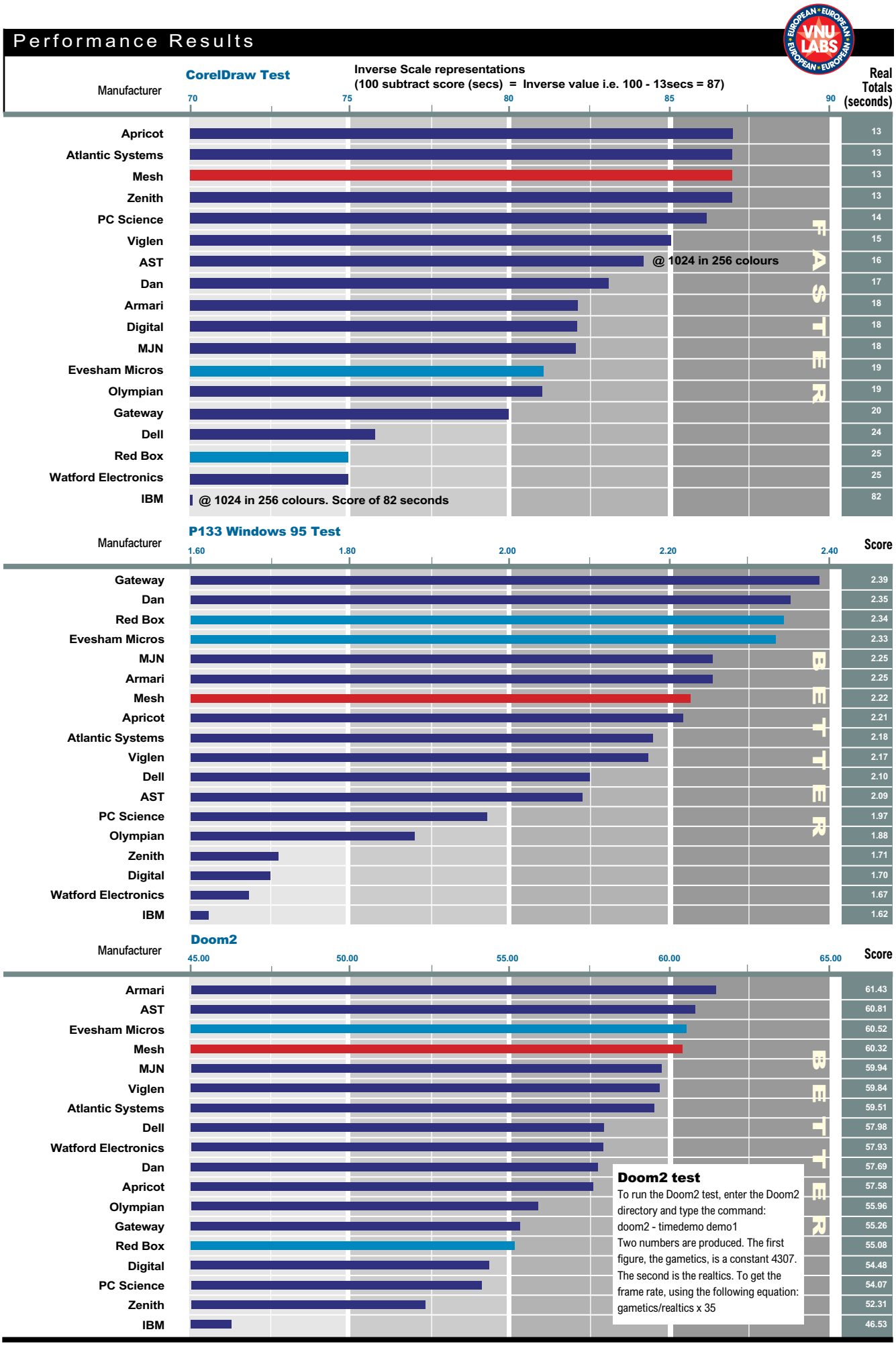
Honourable mentions should really go to Gateway, for its breakaway speed and low price. And the Dan was a worthy opponent, particularly with its desktop configuration and all-round quality hardware bundle.

Our top prize, the *PCW* Editor's Choice, goes to the Mesh. The combination of price, performance, software bundle and peripherals clinched it. For £1,499 Mesh has included the quality ADI MicroScan 5E monitor, a choice of the MS Works 4.0 or Lotus SmartSuite 96 application suites, and Altec Lansing speakers. It also managed a respectable performance by placing in the top seven in our Windows 95 tests, as well as giving superb results in the Doom2 and CorelDraw tests.

On a price, performance and added extras scale, the Mesh is a clear winner.

Personal Computer World EDITOR'S CHOICE

Performance Results

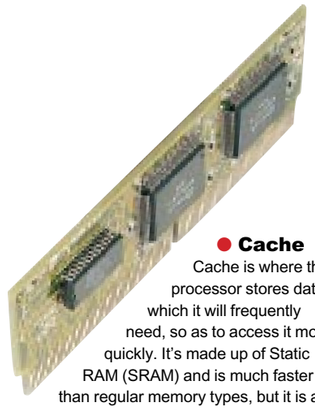


Doom2 test

To run the Doom2 test, enter the Doom2 directory and type the command:
doom2 - timedemo demo1
Two numbers are produced. The first figure, the gametics, is a constant 4307. The second is the realtics. To get the frame rate, using the following equation:
gametics/realtics x 35

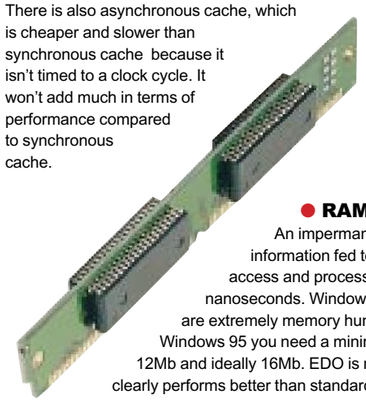
133MHZ MULTIMEDIA PC'S

The components of a 133MHz multimedia PC



Cache

Cache is where the processor stores data which it will frequently need, so as to access it more quickly. It's made up of Static RAM (SRAM) and is much faster than regular memory types, but it is also more expensive. PC cache comes in two sizes, 256Kb or 512Kb, and can be found in a CELP socket or soldered on to the motherboard. The most common cache is synchronous pipeline burst. It can provide a 3-5% increase in PC performance because it is timed to a clock cycle. To have synchronous cache you must have a chipset, such as Triton, to support it. There is also asynchronous cache, which is cheaper and slower than synchronous cache because it isn't timed to a clock cycle. It won't add much in terms of performance compared to synchronous cache.



RAM

An impermanent area of data storage that holds information fed to it by the hard drive for the CPU to access and process at quick speeds, typically 40-60 nanoseconds. Windows 95 and many current applications are extremely memory hungry and gobble up RAM. To run Windows 95 you need a minimum of 8Mb of RAM, preferably 12Mb and ideally 16Mb. EDO is now pretty much the standard and clearly performs better than standard DRAM and FPM-RAM.

CD-ROMs

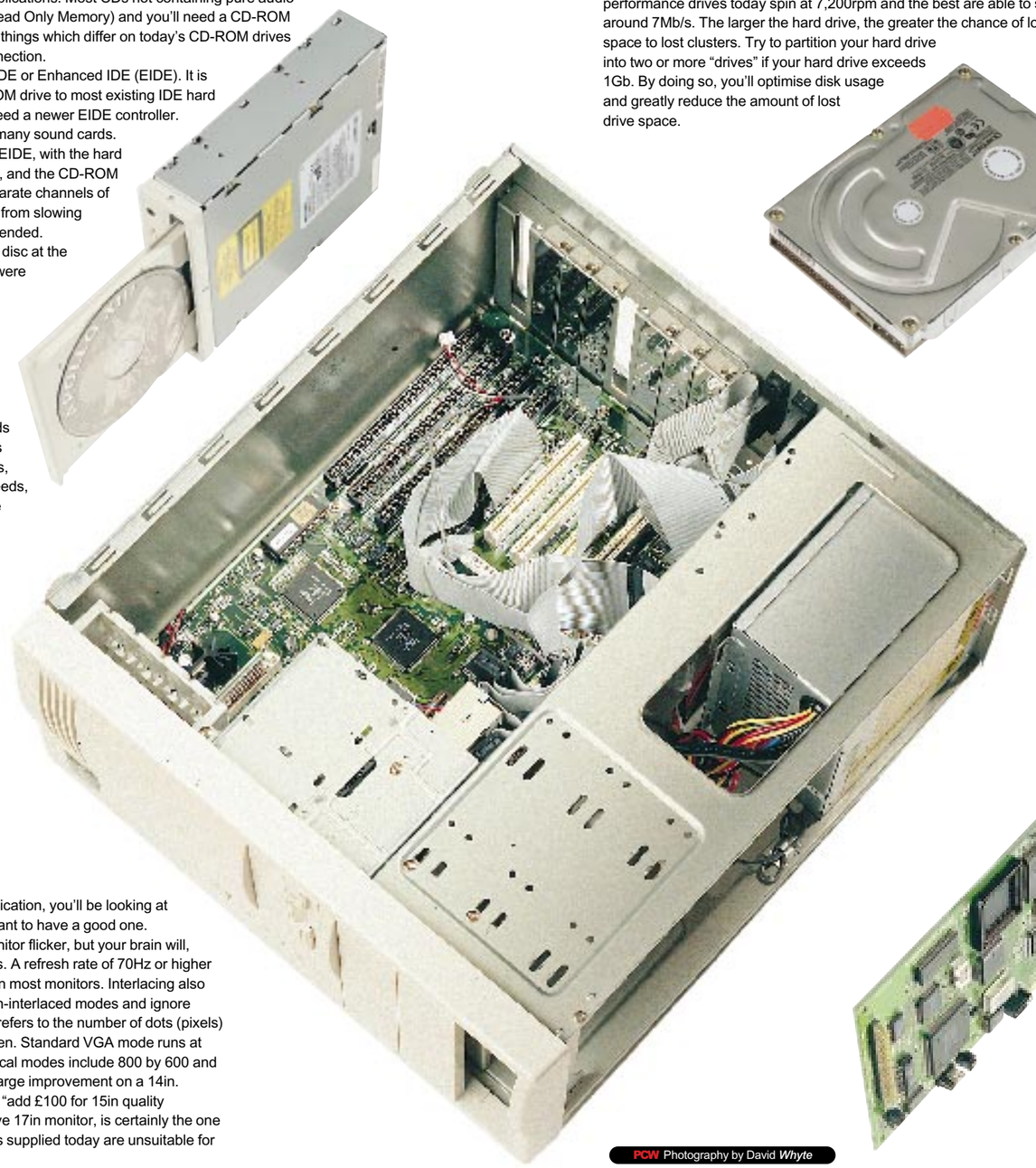
CD-ROM drives

A CD stores digital information which could be audio, photographs, video or plain computer data, such as files or applications. Most CDs not containing pure audio or video are termed CD-ROMs (Read Only Memory) and you'll need a CD-ROM drive to read them. About the only things which differ on today's CD-ROM drives are their speed and means of connection.

The most common connection is IDE or Enhanced IDE (EIDE). It is possible to connect an IDE CD-ROM drive to most existing IDE hard disk controllers. Older PCs may need a newer EIDE controller. IDE controllers are also found on many sound cards.

All PCs in this group test featured EIDE, with the hard disk connected to the first channel, and the CD-ROM drive to the second. Using the separate channels of EIDE prevents the CD-ROM drive from slowing the hard disk and is highly reccomended.

The first CD-ROM drives spun the disc at the same speed as an audio CD and were called single-speed, delivering a sustained data transfer rate of 150Kb/s. Double-speed drives spun twice as fast, doubling the data transfer to 300Kb/s, and quad-speeds twice as fast again, raising transfer to 600Kb/s. Six-speeds (900Kb/s) and eight-speeds (1200Kb/s) are replacing quads as the current standard. By Christmas, expect to see, ten- and twelve-speeds, along with the first Digital Versatile Disc, DVD, drives.

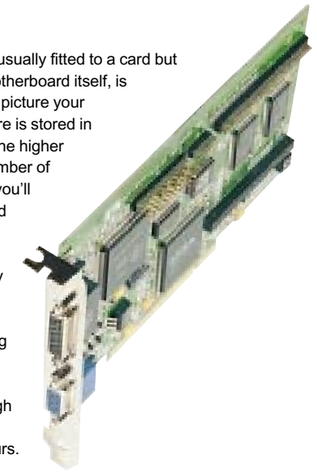


Hard Disk

The hard disk is made of aluminium alloy covered with a magnetic coating, hence the term "hard disk", and it's completely sealed inside the case. Data is recorded onto the magnetic surface of the disk exactly the same way as it is on floppies or digital tapes. Essentially, the surface is treated as an array of dot positions, each of which can be identified and set to a binary "1" or "0". A scheme of guidance marks helps the recorder find positions on the disk, and this is why disks must be formatted before being used.

When it comes to accessing data already stored, the disk spins around very fast so that any part of its circumference can be quickly identified. Disks typically spin about 5,400rpm, or 1/90 second per rotation. High-performance drives today spin at 7,200rpm and the best are able to sustain around 7Mb/s. The larger the hard drive, the greater the chance of losing space to lost clusters. Try to partition your hard drive into two or more "drives" if your hard drive exceeds 1Gb. By doing so, you'll optimise disk usage and greatly reduce the amount of lost drive space.

Video Cards



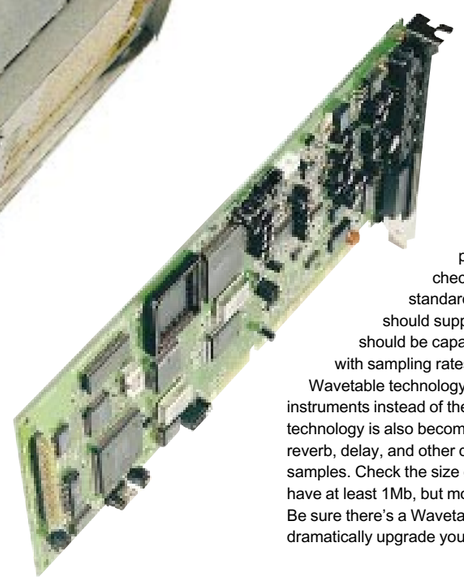
Video or graphics circuitry, usually fitted to a card but sometimes found on the motherboard itself, is responsible for creating the picture your monitor displays. This picture is stored in dedicated video memory. The higher the resolution or greater number of colours, the more memory you'll need, but since it is a shared resource, reducing one will allow an increase of the other. 1Mb of video memory is capable of doing a resolution of 1024 x 768 pixels in 8-bit colour, offering 256 colours. Alternatively, dropping to 800 x 600 pixel resolution will free up enough video memory for 16-bit colour, offering 65536 colours. Almost all the PCs in this group test have at least 2Mb video memory capable of 1024 x 768 pixels in 16-bit colour, 1280 x 1024 at 8-bit or 800 x 600 in 24-bit, just under 16.8 million colours. The type of video memory highly affects performance. D-RAM is slowest, but cheapest; next up is the more expensive, but faster, V-RAM; fastest is W-RAM, currently only available on Matrox cards, but VideoLogic's use of Multibank DRAM (MBDRAM) looks to be competitive. All monitors in this group test should be able to display 1024 x 768 pixels in a flicker-free, non-interlaced mode.

PCI Chipsets

PCI chipsets control the CPU to memory I/O and IDE bus mastering regarding hard disk access and multimedia performance. Older chipsets, such as the Triton FX and Opti Viper, supported memory configurations of standard and EDO RAM up to 128Mb. The newer Triton II 430VX and 430HX now support memory configurations up to 512Mb of RAM, and the 430VX also makes use of the newer SDRAM for improved performance. The data transfer rate for these chipsets is 100Mb/sec, 15 percent more than the FX chipset.

Monitors

Regardless of your computer application, you'll be looking at your monitor all day, so it's important to have a good one. Some people claim not to see monitor flicker, but your brain will, resulting in fatigue and headaches. A refresh rate of 70Hz or higher will produce a flicker-free image on most monitors. Interlacing also results in flicker. Always run in non-interlaced modes and ignore interlaced quotes. The resolution refers to the number of dots (pixels) horizontally and vertically on-screen. Standard VGA mode runs at 640 by 480 pixels, while other typical modes include 800 by 600 and 1024 by 768. A 15in monitor is a large improvement on a 14in. Typically, you'll have the option to "add £100 for 15in quality monitor". This, or a more expensive 17in monitor, is certainly the one to go for, since most 14in monitors supplied today are unsuitable for serious Windows work.



Sound card

The sound card you get with your PC should be pre-installed and ready to go, but it's worth checking to see if it conforms to Plug and Play standards. Most sound cards in new PCs these days should support General MIDI, SoundBlaster, and Adlib, and should be capable of recording and playing back 16-bit stereo with sampling rates up to 44.1kHz. Most sound cards today use Wavetable technology which gives you sampled sounds of real instruments instead of the synthesised sounds used a few years ago. DSP technology is also becoming more widespread on sound cards; this allows reverb, delay, and other digital effects to be applied to instruments or samples. Check the size of samples in ROM. A bog-standard card should have at least 1Mb, but more sophisticated cards can have as much as 4Mb. Be sure there's a Wavetable daughterboard connector, as this can dramatically upgrade your sound card if needed at a later date.

PCW Photography by David *Whyte*

133MHZ MULTIMEDIA PC'S

Office ergonomics

Chairs

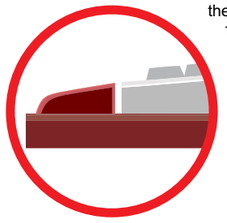
Your chair should be adjustable, and fit you well. This is important, since you can expect to spend up to a third of your day in it. Look for adjustable height, back rest, tilt and back-rest tension features so that you can adjust the chair to a comfortable shape to fit your body preferences and maintain good, upright posture. Levers are better than knobs for adjusters, as they require less hand pressure (particularly good if you suffer from RSI). Look for adjustable armrests as they can help relieve strain on your arms. Lastly, a 5-point caster base is ideal for stability and manoeuvrability. If don't have access to an adjustable chair than limit your seating time to 1 - 2 hours in front of the computer. For lower back support use specially made cushions or, in a pinch, a rolled up towel. If you use a kneeling chair (balans chair) don't rely 100 percent on it. They tend to immobilise your legs and can put pressure on your shins and knees. Take plenty of breaks and alternate with a regular chair.

Arms and wrists

Ideally, arms and elbows should be in a relaxed downward position, close to your sides, and be bent at an angle between 90 and 100 degrees. Your wrists should be straight and at elbow level or below as this position is the most relaxing for your muscles. Whenever possible make use of the armrests as they help take a load off your shoulders and neck, but make sure they are not too high or low. NEVER rest your wrists on a hard or sharp surface as this will restrict blood flow and put pressure directly on the nerves vessels and tendons in the wrist.

Keyboards and wrist rests

If you can, select a keyboard with light action. This will help you avoid pounding away on stiff or springy keys which could lead to undue strain on the wrists and hands. Consider getting a wrist rest. They are good for arm support and they keep the wrists in a more natural position. They also reduce any pressure that can be placed on the nerves and vessels in your hand. The wrist rest should be deep, stiff and the same thickness and length of the keyboard.

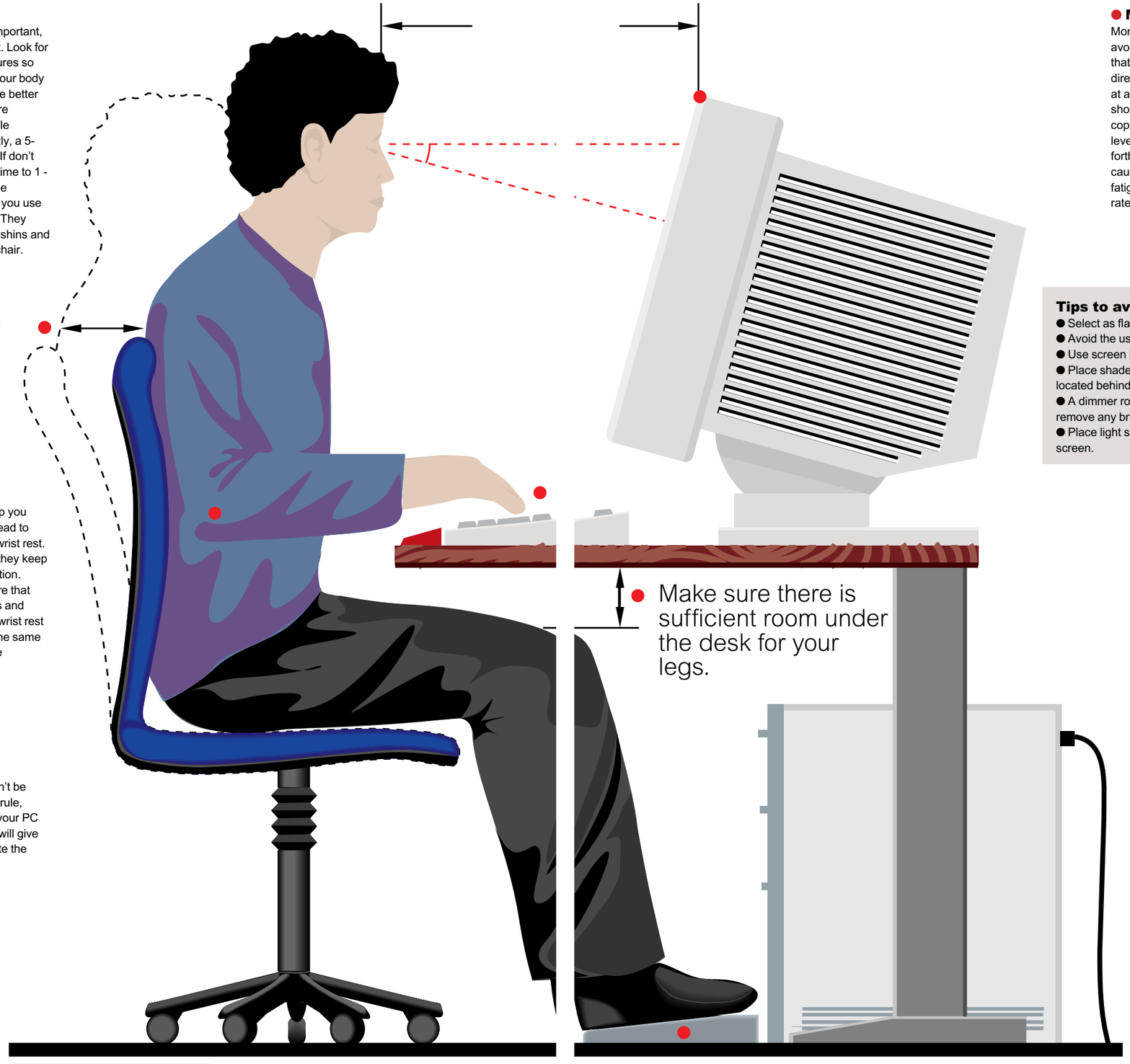


Feet

Foot-rests can be helpful, especially if the chair or desk can't be lowered, but feet resting on the floor is always better. As a rule, make sure the area by your feet is free from any boxes or your PC tower case. Find somewhere else to store your gear. This will give your legs plenty of freedom to move about and will eliminate the possibility of you kicking power or monitor cords loose.

Desk

If you have the space, then get as large desk as you can accommodate. Deeper is better than longer, as a standard 15in monitor will take up a minimum of 1.5 square feet, and if you have a desktop PC you can expect it to use 2 square feet plus room for your keyboard. If possible, have a desk where you can adjust the height. This is important if your chair adjustment is limited.



PCW Ergonomics Illustration by Paul *Wootton*

Monitors/eyestrain

Monitor placement is one of the most important factors in avoiding muscle ache and eye strain. Set up your desk so that whatever you look at most, documents or the monitor, is directly in front of you. The position of the monitor should be at arms length. The part of the screen that you look at most should be between eye-level and 20 degrees below. Use a copy holder for your documents to keep them at the same level as the monitor, especially if you are switching back and forth frequently. Glare and screen flicker are the greatest cause of eyestrain and they can also lead to headaches, fatigue and, in some cases, nausea. Set the vertical refresh rate of your monitor to a minimum of 72Hz non-interlaced.

Tips to avoid screen glare

- Select as flat-screened a monitor as possible.
- Avoid the use of overhead florescent lights.
- Use screen hoods or glare filters.
- Place shades on any windows, particularly if they're located behind you.
- A dimmer room is better than a brighter room, so remove any bright lights or shiny objects.
- Place light sources parallel with the line of sight of the screen.

Pointing Devices

Using a mouse can be physically demanding as it requires your whole hand to hold and move the entire device as well as exerting force to click buttons. If you use a mouse, select a specially designed ergonomic model that supports your hand well in its natural resting position. Trackballs are good as they reduce hand and wrist motion, but they can lead to a degree of wrist extension and thumb and finger strain. Avoid small trackball designs as they can be hard to control and can require a lot of repetitive movement, but too large a trackball can cause wrist over-extension.

Placing your PC

If your PC is a floor-standing tower system, it should be placed well out of the way of your feet. If you have a desktop PC and limited desk space, you can also place it on the floor vertically on its side, although this may make access to the drives awkward. This will clear desk space and help reduce any fan noise. There shouldn't be any problem with your floppy disk drive operating in a vertical position, but if you have a CD-ROM drive check to see if the CD tray has clips to hold the CD-ROM in place.

How we did the tests

Different types of applications measure different aspects of a PC's performance, so it's important to use more than one benchmark to gain an accurate and rounded picture of each machine. Here, we've put each PC through three separate performance tests.

The first test assesses performance in three key areas — word processing, spreadsheets and databases. It installs a selection of popular office applications including Word, Excel, WordPerfect and FoxPro. A collection of macros are then run in each application, and every process is timed and recorded. When a copy operation in a spreadsheet is about to take place, the macro containing the {COPY} instruction will first trigger the stopwatch. When the copy has completed, the time taken is written into a database file. Every test is run three times, to provide a consistency check, and the three scores recorded are averaged out to produce an overall figure.

The second test run in CorelDraw records the time taken to open a series of large graphics files. This is a simple but revealing test which measures how each machine performs when using memory-intensive applications in Windows 95. The wide spread of results produced from the 16 machines included here shows the importance of this test.

Thirdly, a low-level benchmark is run in DOS using the frame-rate performance test from Doom II. It tests the graphics card and hard disk, and it is noticeable from the list of results that certain combinations of components produce exceptionally high scores. The three highest results on this test came from machines with both a Quantum Fireball hard disk and a Diamond Stealth 64 graphics card.

The final test runs the program pccheck.exe which is an analysis tool rather than a performance test. This interrogates the system and verifies the existence of all claimed components, giving the exact speed of the processor and size of the cache. Any deficiencies reported by this program help the tester to explain freak results produced by any machine.

A separate monitor test, DisplayMate for Windows, tests each monitor for distortion, sharpness and horizontal resolution of images, colours and grey-scale clarity, and consistency of colour across the screen.

Eleanor Turton-Hill

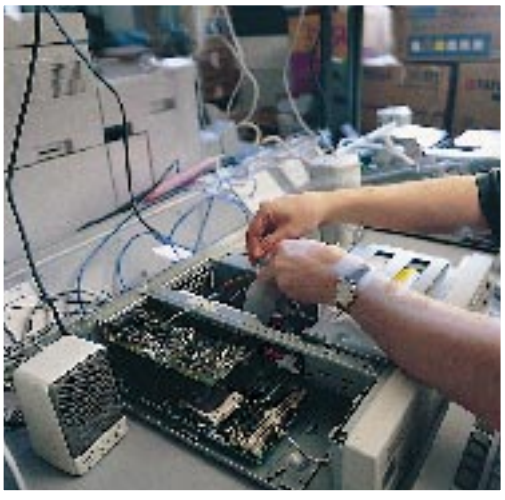


TABLE OF FEATURES

Manufacturer	Apricot	Armari	AST	Atlantic	Dan	Dell
Model Name	Apricot MS 540	eXPS-IIH Media DSP	Bravo MS 5133	Atlantic Pro 96 P133	Dantum 95 - 133MHz	XPS P133s
Tel No	0800 212 427	0181 810 7441	0990 611 611	01792 700 002	0181 830 1100	01344 720 000
Fax No	0121 717 0132	0181 810 5783	01756 702 889	01792 792 888	0181 830 1122	01344 723 699
Price (excl. VAT)	£2,619	£1,949	£1990*	£1,509	£1,973	£1,599
Basics						
Processor Manufacturer/ Model	Intel Pentium 133 MHz	Intel Pentium 133 MHz	Intel Pentium 133 MHz	Intel Pentium 133 MHz	Intel Pentium 133 MHz	Intel Pentium 133 MHz
Expansion Bus						
Local bus Architecture	PCI	PCI	PCI	PCI	PCI	PCI
No. of local bus only slots	1	4	1	3	3	4
No. of ISA only slots	3	4	2	3	2	3
No. of shared local bus/ISA slots	1	N/A	1	1	1	1
Motherboard Manufacturer	Apricot	Supermicro	Intel	Soyo	Asustek	Intel
Motherboard Model	Diamond	P55T2S	Rhinestone	N/A	P55t2P4	Tigershark
Chipset	Triton	Triton	Triton 430 VX	Triton	Triton	Triton 430 VX
No. of spare external 3.5in bays	0	0	3	1	0	1
No. of spare external 5.25in bays	0	2	2	1	1	2
Hard disk						
Manufacturer	Quantum	Quantum	Maxtor	Western Digital	Quantum	Western Digital
Size (Gb)	1.2	1.2	1.2Gb	1	1.2	1.6Gb
Interface	EIDE	EIDE	EIDE	EIDE	EIDE	EIDE
Average access time (ms)	12	12	16	11	12	12
RAM and Secondary Cache						
Main RAM	16	16	16	16	16	16
Max RAM	128	768	128	128	128	128
RAM Type	EDO	EDO	EDO	EDO	EDO	EDO
SIMM Type (pins)	72	72	72	72	72	168
Secondary cache (Kb)	256	512	256	256	512	512
Max secondary cache (Kb)	512	512	512	512	512	512
Cache type	Asynchronous	Pipeline Burst	Pipeline Burst	Pipeline Burst	Pipeline Burst	Pipeline Burst
Multimedia						
CD-ROM Manufacturer	Sony	Teac	Sanyo	Creative Technologies	Gold Star	NEC
CD-ROM Model	CM 77E	56E	CDR-51	CD620E	GCD-r580B	CDR -1400A
CD-ROM Speed	4X	6X	6X	8X	8X	8X
Sound Card Manufacturer	Creative Labs	IBM OEM MWAV DSP Adapter	Creative Labs	Creative Labs	Creative Labs	Creative Labs
Sound Card Model	Vibra 16 (on-board chip)	Media DSP	Vibra 16 (on-board chip)	SoundBlaster Vibra 16	SoundBlaster AWE 32	Vibra 16 (on-board chip)
Graphics						
Graphics Card Manufacturer	Cirrus Logic	Matrox	ATI	ATI	Matrox	Number Nine
Graphics Card Model	GD 5436 (on-board chip)	Millenium	Video Xpression	Video Xpression	Millenium	Motion 771
Graphics Card RAM/Max RAM	1Mb/2Mb VRAM	2Mb/8Mb WRAM	1Mb/2Mb SGRAM	2Mb/4Mb EDO RAM	2Mb/8Mb WRAM	2Mb VRAM
Monitor Manufacturer	Apricot	Iiyama	N/A	ADI	Iiyama	Nokia
Monitor Model	XJ55639	Vision Master Pro 17	AST Vision 7L	5V	Vision Master 17	447W
Monitor Maximum Refresh Rate at 1200x1024 (Hz)	75	100	75	60	100	70
Other Information						
Added extras	Dataflex Comms fax/modem				Zoom Telephonics 28.8 modem	
Speakers		Yamaha YST M15	Headphones with mic	Trust Soundwave 40	DC-691	Altec Lansing ACS31
Standard Warranty (years, BTB or on-site)	1 yr on-site	1 yr on-site	3 years BTB	1 year on-site, 4 years BTB	1 year BTB	1 yr BTB
Software supplied	MS Works 4.0 MS Money Apricot Ent. Centre	MS Works 4.0 Trio Comm. Centre		Lotus SmartSuite 96 Quicken 3.0 Corel 4.0	Lotus Organiser MS Works 4.0 MS Encarta 96, Games	MS Office Pro 95
Warranty options	2nd & 3rd yr via reseller	2nd & 3rd yr on-site options	N/A	2nd & 3rd year on-site	On-site	2-5 yrs BTB or next day
Tech support line	via reseller	●	●	●	●	●
Fax support	●	●	●	●	●	●
Company turnover (most recent figures available)	$36,5 billion	£2 million	£2.468 billion	£20 million	£39 million	$5.3 billion
Number of staff	110,000	6	N/A	86	N/A	7,800

KEY ● Yes ❍ No * AST (about 10% less at dealer)

133MHZ MULTIMEDIA PC'S

TABLE OF FEATURES

Manufacturer	Digital	Evesham	Gateway	IBM	Mesh	MJN
Model Name	Digital Celebris 133	Vale Platinum HX P133	P5-133	Aptiva	Elite 133 Professional	MJN Bestbuy System C25
Tel No	0345 227 228	01386 765 500	0800 55 2000	0990 72 72 72	0181 452 1111	01282 777 555
Fax No	0181 893 8889	01386 765 354	00 353 1 848 2022	0990 72 72 72	0181 208 4493	01282 770 844
Price (excl. VAT)	£2812 (RRP)	£1,789	£1,469	£2,041	£1,499	£1,629
Basics						
Processor Manufacturer and Model	Intel Pentium 133 MHz	Intel Pentium 133 MHz	Intel Pentium 133 MHz	Intel Pentium 133 MHz	Intel Pentium 133 MHz	Intel Pentium 133 MHz
Expansion Bus						
Local bus Architecture	PCI	PCI	PCI	PCI	PCI	PCI
No. of local bus only slots	1	3	3	1	3	3
No. of ISA only slots	1	2	2	5	2	3
No. of shared local bus/ISA slots	1	1	1	1	1	1
Motherboard Manufacturer	Digital	Intel	Intel	IBM	Mesh OEM	DTK
Motherboard Model	N/A	Advanced/ML	Aladdin	IBM	P55/512	PAM 00551
Chipset	Triton	Triton 430 HX	Triton	Opti Viper	Triton 430 VX	Triton 430 HX
No. of spare external 3.5in bays	0	2	0	0	2	1
No. of spare external 5.25in bays	0	1	2	3	2	2
Hard disk						
Manufacturer	Maxtor	Seagate	Western Digital	IBM	Quantum	Seagate
Size (Gb)	1.2	2Gb	1.2Gb	1.6Gb	1.2Gb	2Gb
Interface	EIDE	EIDE	EIDE	EIDE	EIDE	EIDE
Average access time (ms)	11	10	11	N/A	11	10
RAM and Secondary Cache						
Main RAM	16	16	16	16	16	16
Max RAM	128	128	128	128	128	128
RAM Type	EDO	EDO	EDO	EDO	EDO	EDO
SIMM Type (pins)	72	72	72	72	72	72
Secondary cache (Kb)	256	256	256	256	512	512
Max secondary cache (Kb)	512	256	256	512	512	512
Cache type	Pipeline Burst	Pipeline Burst	Pipeline Burst	Pipeline Burst	Pipeline Burst	Pipeline Burst
Multimedia						
CD-ROM Manufacturer	Toshiba	Panasonic	Wearns	IBM	Toshiba	Teac
CD-ROM Model	XM-5303B	CR-583	CDD-820	CRMC-FX400C3	XM-5522	CD-56E
CD-ROM Speed	4X	8X	8X	4X	6X	6X
Sound Card Manufacturer	ESS	Creative Labs	Ensoniq	IBM	Creative Labs	Orchid
Sound Card Model	ESS 1688 on-board chip	SoundBlaster AWE 32	Viva	MWAVE DSP	SoundBlaster AWE 32	Nu Sound
Graphics						
Graphics Card Manufacturer	Matrox	Matrox	Matrox	Trident	ATI	Matrox
Graphics Card Model	Millenium	Millenium	Millenium	TGUI 9680 on-board chip	Mirage	Millenium
Graphics Card RAM/Max RAM	2Mb/8Mb WRAM	2Mb/8Mb WRAM	2Mb/8Mb WRAM	1Mb/2Mb VRAM	2Mb/8Mb	4Mb/8Mb WRAM
Monitor Manufacturer	Digital	Smile	Mag Imovision	IBM	ADI	CTX
Monitor Model	FR-PCXBV-KA	Vale EcoScan	Vivitron 1776	G50	Microscan 5EP	1765D
Monitor Maximum Refresh Rate at 1200x1024 (Hz)	60	60	n/a	72	100	75
Other Information						
Added extras		Zydec Zy-Fiz 32		Mic		Super Highway 28.8 modem
Speakers			Altec Lansing ACS250	Sound Works by Henry Kloss	Altec Lansing AC55	Sound Force 600
Standard Warranty (years, BTB or on-site)	1 yr on-site, 2/3 yrs BTB	1 year on-site	1 yr on-site, 2 yr BTB	1 year BTB	1 yr on-site	1 yr BTB
Software supplied		MS Works 4.0 MS Media Pack	MS Office Pro 95 MS Encarta 96	Lotus Smart Suite 96 MS Works 4.0 Aptiva Entertainment Center	MS Works or Louts Smart Suite 96	Lotus Smart Suite 96 GST Design Works GST Money matters
Warranty options		2nd & 3rd year on-site	3 yrs on-site	3 year BTB	2-5 yrs on-site	3yrs BTB, 5yrs BTB
Tech support line	●	●	●	●	●	●
Fax support	●	●	●	●	●	●
Company turnover (most recent figures available)	$14 billion	£45 million	n/a	N/A	n/a	£100 million
Number of staff	61,700	210	1,000	N/A	n/a	360

KEY ● Yes ❍ No

TABLE OF FEATURES

	Olympian	PC Science	Red Box	Viglen	Watford	Zenith
Manufacturer	**Olympian**	**PC Science**	**Red Box**	**Viglen**	**Watford Electronics**	**Zenith**
Model Name	**Evolution 2000/133MM**	**Multimedia Pro**	**CP 133+ Pro**	**Power 133**	**Professional Media P133**	**Z-Station GT 133 model 1600C**
Tel No	0181 880 4222	01423 323 386	01480 405 541	0181 758 7000	01582 745 555	01756 702 800
Fax No	0181 880 4223	01423 323 370	01480 471 687	0181 758 7080	01582 488 588	01756 702 889
Price (excl. VAT)	£1,870	£1499	£1899	£1,717	£1,626	£2360
Basics						
Processor Manufacturer and Model	Intel Pentium 133 MHz	Intel Pentium 133 MHz	Cyrix P133+ (6x86)	Intel Pentium 133 MHz	Intel Pentium 133 MHz	Intel Pentium 133 MHz
Expansion Bus						
Local bus architecture	PCI	PCI	PCI	PCI	PCI	PCI
No. of local bus only slots	3	2	4	3	3	3
No. of ISA only slots	2	4	5	2	2	4
No. of shared local bus/ISA slots	1	1	1	1	1	1
Motherboard Manufacturer	TMC	Chicony	Tyan	Intel	Aries	Intel
Motherboard Model		824301	SI 562	Endeavour	PCISuits	n/a
Chipset	Triton	Triton	Triton 430 HX	Triton 430 HX	Triton	Triton 430 HX
No. of spare external 3.5in bays	1	1	2	1	1	0
No. of spare external 5.25in bays	2	1	3	3	2	3
Hard disk						
Manufacturer	Quantum	IBM	Quantum	Seagate	Conner	Western Digital
Size (Gb)	1.2Gb	1.7Gb	1.2Gb	1Gb	1.2Gb	1.6Gb
Interface	EIDE	EIDE	EIDE	EIDE	EIDE	EIDE
Average access time (ms)	11	9	11	11	10	10
RAM and Secondary Cache						
Main RAM	16	16	16	16	16	16
Max RAM	128	128	512	128	128	128
RAM Type	EDO	EDO	EDO	EDO	EDO	FPM RAM
SIMM Type (pins)	72	72	72	72	72	72
Secondary cache (Kb)	512	256	512	256	256	512
Max secondary cache (Kb)	512	512	512	512	512	512
Cache type	Pipeline Burst	Pipeline Burst	Pipeline Burst	Pipeline Burst	Pipeline Burst	Pipeline Burst
Multimedia						
CD-ROM Manufacturer	Mitsumi	Aztech	Aztech	Teac	Panasonic	Toshiba
CD-ROM Model	FX-600	CDA 868	CDA 868	CD-56E	CDA 868	XM5302B
CD-ROM Speed	6X	8X	8X	6X	8X	4X
Sound Card Manufacturer	Creative Labs	IBM	Creative Labs	Creative Labs	Creative Labs	Creative Labs
Sound Card Model	Vibra 16S	Sound Miracle 28.8	SoundBlaster AWE 32	Vibra 16 (on-baord chip)	Vibra 16S	Vibra 16S
Graphics						
Graphics Card Manufacturer	Matrox	Matrox	VideoLogic	ATI	VideoLogic	ATI
Graphics Card Model	Millenium	Millenium	GrafixStar 600	Video Xpression	GrafixStar 700	Mach 64VT
Graphics Card RAM/Max RAM	2Mb/8Mb WRAM	2Mb/8Mb WRAM	2Mb/4Mb MBDRAM	2Mb DRAM	2Mb VRAM	2Mb
Monitor Manufacturer	ADI	Daytek	Iiyama	Viglen	Panasonic	Zenith Data Systems
Monitor Model	Microscan 5V	DT1730	8617E	Envy	TXD 1733	ZCM 1750 XT
Monitor Maximum Refresh Rate at 1200x1024 (Hz)	76	75	60	60	90	76
Other Information						
Added extras		Joystick, microphone		Dataflex modem	Xlink 288 Fax/modem	
Speakers	Active 75	Trust 3D Sound Dimension	Altech lansing S31X	Sound Force 600	Juster SP800	
Standard Warranty (years, BTB or on-site)	1 yr on-site, lifetime RTB (L)	1 yr on-site	1 yr on-site	1 yr BTB	1 yr on-site(P/L), 5 yrs BTB (L)	1 yr on-site, 2 years BTB
Software supplied	Lotus SmartSuite 96 Quicken 3.0 Corel 4.0	Trio Comms Suite Treasure Chest CD's	MS Office Pro 95	MS Works 4.0 Cyberworks Win95 Multimedia CD	Easy Tutor for Win 95 Free trial disks for Pipex, Tell Me Delrina 4 in 1 comms	Norton Anti-Virus Norton Navigator Netscape browser
Warranty options	2 or 3 yrs on-site	2-3yrs on-site	2nd & 3rd year on-site or BTB		3 yr on-site (P/L)	2nd & 3rd yr on-site
Tech support line	●	●	●	●	●	●
Fax support	●	●	●	●	●	●
Company turnover (most recent figures available)	n/a	£4 million	£3 million	£94 million	£33 million	£327 million
Number of staff	n/a	22	18	280	90	2000

KEY ● Yes ❍ No

Looking good

Stephen Wells shows you how to adapt form templates, choose a suitable design style and produce illustrative charts for best presentation of your data.

THE BEST SOFTWARE companies give emphasis to helping their customers look good — and so it is with Excel 7. You're not only guided towards finding the best solution for your application but also to presenting yourself and your company in the best possible light.

Your first option is to use or adapt one of a series of online layouts which Microsoft calls, "Solution Templates", (see *Figs 1 & 2*). Six of the most common forms used in business are handed to you on a plate. You can easily vary the design as I have done with the Time Card heading, or Anglicise the "City, State, Zip" to town, county and postcode.

The little red squares indicate helpful cell notes. For example, in the coloured area under TOTAL, if you point to the square, this note appears: "The shaded cells contain formulas and are automatically calculated".

Some of the forms include list boxes. On the Sales Quote form you are offered a list of product or service names. You select one and the name and its price are automatically added to the quotation.

Each template comes with its own customising template, as seen in *Fig 3*. Here you can enter information which always appears on your form, such as the company's own name and address. You can have defaults for, say: the VAT rate, a fixed delivery charge, or a list of the credit cards which the company accepts. And you can enter the paths to the databases for the list boxes. You can also paste in your own logo, as I have done, for all the forms.

The customising template even has its own optional toolbar with buttons for things like displaying or removing example data, or the cell tips.

In addition to the six templates illustrated, there are business and personal planners, a loan manager, and a planner for car leasing.

The Business Planner is a workbook consisting of eight worksheets. You enter the results for the four quarters of a company's financial year and the Planner produces a Balance Sheet, and Income and Cash Flow statements, with illustrative charts. One of the worksheets is a customising template so you can tailor the main templates to your specific needs.

Figs 1 & 2 *Excel 7 includes a number of "Solution Templates": easily-customised, pre-designed common forms*

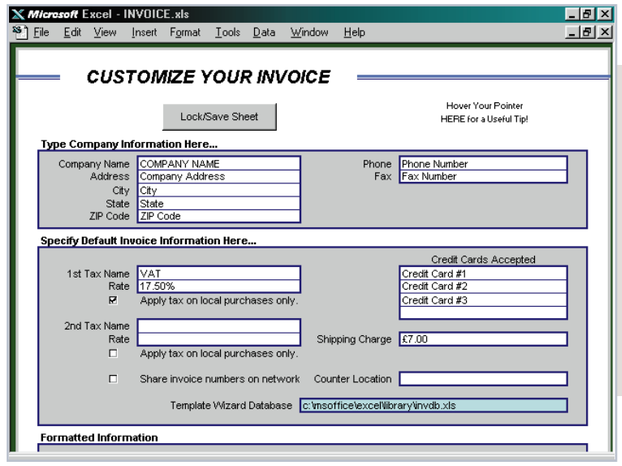


Fig 3 *Each template comes with its own separate customising template for setting boilerplate, default entries and paths to databases*

The knowledge of all fonts

After templates, your next design option is to take advantage of built-in styles. Many users are more at home with the math of their worksheets than their aesthetic design. In fact, many people are not aware of the different typefaces used by their favourite newspapers and magazines until offered choices in PC software font boxes.

To a typographer, a font refers to only one set of characters, of a certain weight and size in a given typeface: for instance, Garamond Book italic, 12-point. But it has become commonplace in computing to refer to a *typeface* as a font.

A "style", in general software parlance, refers to that combination of typography, rules, panels and colours which jazzes-up your application. The objectives are firstly to make a worksheet easier to read and secondly to lend continuity to your communications. Ideally, the style should be appropriate to the business: a firm of solicitors would wish to be more formal than a music company record label, for instance.

On your worksheet, you simply select the range which you wish to stylise and choose Format, AutoFormat, then pick from one of 16 predesigned formats — three of these are shown in *Fig 4*, and the fourth one, on the lower right, is one I prepared earlier. But once a style has been created, it is easy to duplicate. Just select the formatted range, click the Format Painter button, then sweep it over an unformatted range.

You can also name and save styles using Format, Style, but those only refer to one cell or a range of identical cells. Certainly, when designing a new worksheet it is useful to have the Formatting Toolbar visible. One tool not on the default version is the AutoFormat button. Right-click on a toolbar and select Customise and the Formatting Category, then drag the AutoFormat button to the Formatting Toolbar. The first click on this button re-applies the most recent format to any selected range. Even better; if you hold down Shift when you click this button, you can step through the AutoFormats listed in the AutoFormat dialogue box.

Some of the most useful tools for formatting a spreadsheet are shown in *Fig 5*. In this case, the regular Formatting Toolbar has been augmented but you can create your own custom toolbar with it's own name and attach it to a workbook. Choose Insert, Macro Module, then Tools, Attach Toolbars. In the Custom Toolbars box, click the name of the toolbar you want to copy to the active workbook. Click Copy. Your toolbar will not only automatically appear the next time you open that workbook but will be positioned where you left it.

Every picture tells a story

The significance of many spreadsheet tables can best be communicated using a chart, and with each new version Excel has made it progressively easier to create them.

In Excel 7, once you get used to the idea that every element of a chart is an "object" and that it is very easy to set or change the "properties" of any object (usually with a right-click of the mouse),

	A	B	C	D	E	F	G	H	I	J	K
1		Jan	Feb	Mar	Total			Jan	Feb	Mar	Total
2	Region 1	3,456	3,802	4,182	11,439		Region 1	3,456	3,802	4,182	11,439
3	Region 2	3,629	3,992	4,391	12,011		Region 2	3,629	3,992	4,391	12,011
4	Region 3	3,810	4,191	4,610	12,612		Region 3	3,810	4,191	4,610	12,612
5	Region 4	4,001	4,401	4,841	13,242		Region 4	4,001	4,401	4,841	13,242
6	Region 5	4,201	4,621	5,083	13,905		Region 5	4,201	4,621	5,083	13,905
7	Totals	£19,097	£21,006	£23,107	£63,210		Totals	£19,097	£21,006	£23,107	£63,210
8											
9		Jan	Feb	Mar	Total			Jan	Feb	Mar	Total
10	Region 1	3,456	3,802	4,182	11,439		REGION 1	3,456	3,802	4,182	11,439
11	Region 2	3,629	3,992	4,391	12,011		REGION 2	3,629	3,992	4,391	12,011
12	Region 3	3,810	4,191	4,610	12,612		REGION 3	3,810	4,191	4,610	12,612
13	Region 4	4,001	4,401	4,841	13,242		REGION 4	4,001	4,401	4,841	13,242
14	Region 5	4,201	4,621	5,083	13,905		REGION 5	4,201	4,621	5,083	13,905
15	Totals	£19,097	£21,006	£23,107	£63,210		Totals	£19,097	£21,006	£23,107	£63,210

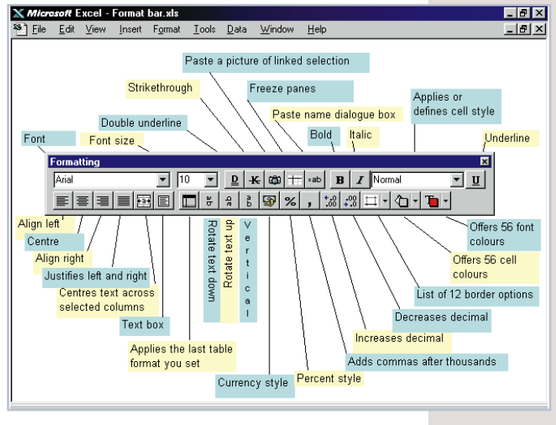


Fig 4 (above) *Three of the built-in styles offered in Excel 7. The one shown, lower right, has been custom-made with no difficulty*

Fig 5 (left) *You can augment the standard Formatting Toolbar with other optional tools, or transfer buttons from other Toolbars. For a serious design session, here are 29 of the most useful tools*

X3

Geography made easy

Conventional charts convert tabular data into bars, lines, pie sections or mechanically repeated graphics. New in Excel 7 is the facility for plotting practically any kind of information onto charts which are maps. It might be population figures, median incomes, product sales, weather statistics, or locations. You could illustrate the locations of all your company's offices across Europe, for instance.

You usually start with a worksheet laid out like a database with the categories of data entered in columns and the results entered, like records, in the rows. One column must be geographic regions. If Excel doesn't initially recognise the countries, regions, counties or cities you use, there is a built-in list from which you can copy and paste, although it's buried deep in

`C:\Program\Common\Shared\Datamap\Data\Mapstats.xls`

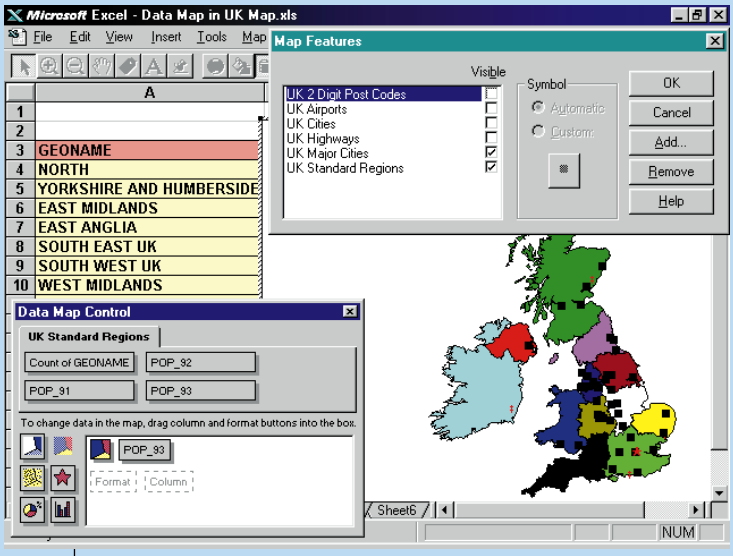
(More places are recognised in Mexico than in the UK!).

You then select that data, click the button with a Globe on it, and the Data Map program samples your data and presents a map that makes sense whether it's Europe, the UK, Australia, the USA, or the world.

To pan across the world, there is a Grabber button, and Zoom In and Out buttons for selecting precisely the area you want. If you double-click the map, a special Map Toolbar appears, which is not normally available, and Help changes to cover mapping only.

If you select the Map Labels button you can hover the mouse over a region or country and the appropriate name appears but doesn't register until you've selected the preferred final position and clicked. The add Text button is useful for adding additional place names without having to make Text Boxes.

There are many more options: from superimposing pie or bar charts over each country, to adding lines of longitude and latitude. And, as the Data Map is an OLE 2.0 server, you can insert your map into a Word 7 document or PowerPoint presentation.



The simple steps for producing a map: A worksheet of data in the background, from which is drawn the map with one click of a button; the drag and drop Data Map Control box; and the Map Features box for adding or removing cities, roads, airports and postcodes

then making charts becomes a piece of cake.

Typically, you start with a table. The columns most often represent time (months, quarters or years) and for reference they're called the "categories". Traditionally, the rows carry the data series which might be anything from a list of chartered accountants, to product lines, to countries, to club members.

The contents of a cell is a value. It might be the total annual sales of the product on that row, for the year represented by that column. These values are usually displayed on the vertical (or y) axis. The categories are usually displayed on the horizontal (or x) axis.

Data series are often listed in a legend box on the side. The x and y axes have their own labels. A marker, which might be a bar, or a dot on a line, displays the data series.

Excel 7 includes 14 basic chart types, many of which offer a number of variations. You can also combine chart types like bars, with line charts, and have charts with two y axes.

That rounds off the end of this three-part tutorial on Excel 7 and I've covered all the principal features which the publisher has included. The stories of how Excel is used are never-ending, however, so for news of the current applications to which readers put this package, see my *Spreadsheets* column in our *Hands On* section every month.

Shortcuts for shaping up

Here's a guide for speed demons, or travellers using portables, who wish to enjoy mouse-free formatting. Where you would normally use the Shift key, you still do, so CTRL+$ can also be written as CTRL+SHIFT+4 and so on.

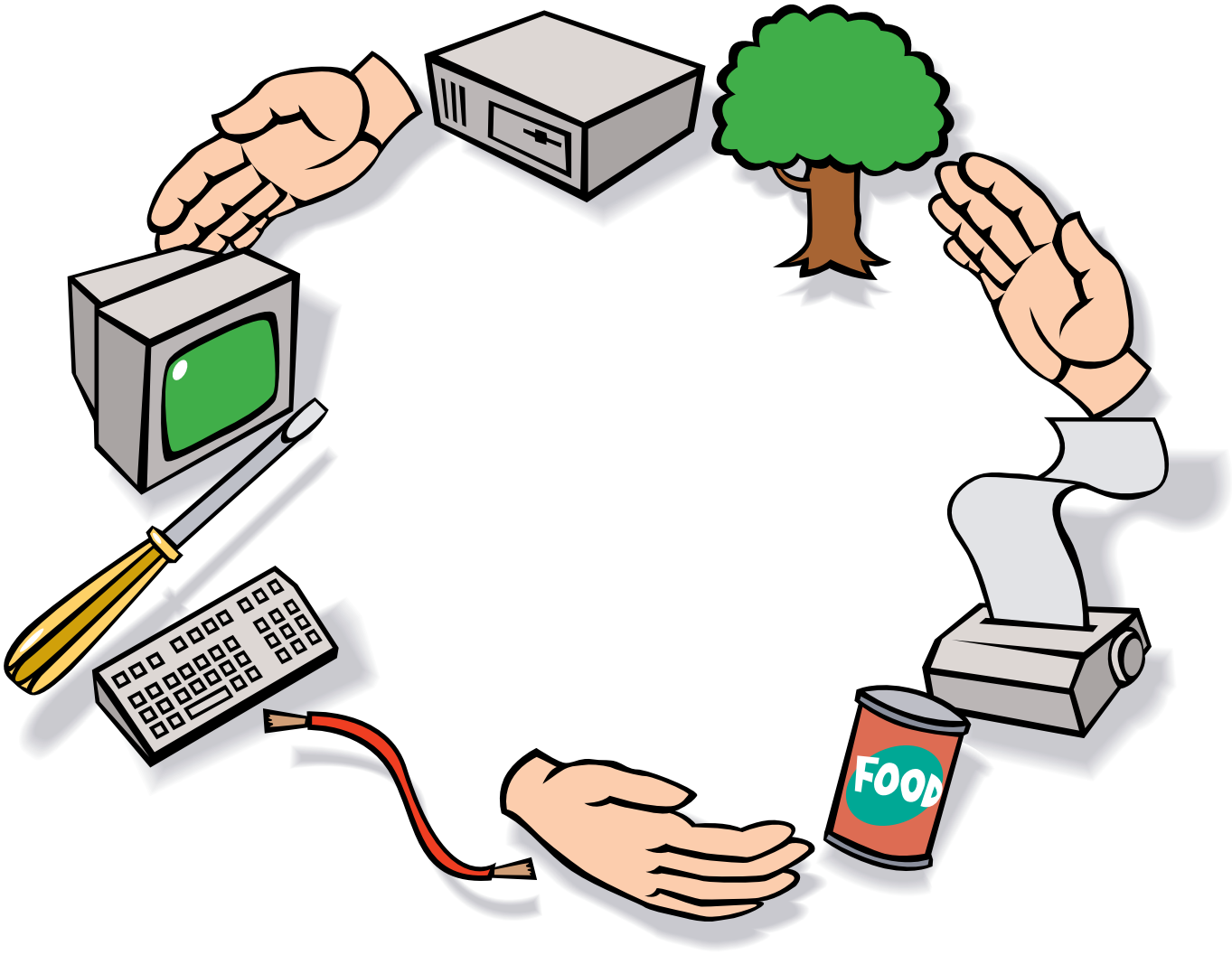
Open the Format, Style dialogue box	ALT+' *(apostrophe)*
Open the Format, Cells dialogue box	CTRL+1 *(one)*
General number format	CTRL+~ *(tilde)*
Currency format with two decimals and negative amounts in red	CTRL+$
Percentage format with no decimal, or comma	CTRL+%
Exponential number format, two decimals	CTRL+^ *(carat)*
Date format with day, month and year	CTRL+#
Time format with hours, minutes, a.m or p.m	CTRL+@
Number format with two decimals and comma	CTRL+!
Outline border	CTRL+&
Remove all borders	CTRL+_ *(underline)*
Apply or remove bold formatting	CTRL+b
Apply or remove italic formatting	CTRL+i
Apply or remove an underline	CTRL+u
Apply or remove strikethrough formatting	CTRL+5
Hide rows	CTRL+9
Unhide rows	CTRL+(*(Left paren.)*
Hide columns	CTRL+0 *(zero)*
Unhide columns	CTRL+) *(Right paren.)*
Insert a line break	ALT+ENTER
Insert a tab character	CTRL+ALT+TAB

PCW Contacts

Stephen Wells welcomes comments and suggestions via *PCW* Editorial at the usual address or at **Stephen__Wells@msn.com**

Microsoft 01734 270001

A new lease of life



Think twice before you head for the dustbin with your unwanted and outmoded computer equipment. It could represent a whole new system for somebody, as Tim Nott reports.

PCW Illustration by Andy *Parker*

A cynic, to quote Oscar Wilde, is someone "…who knows the price of everything and the value of nothing." So what is the price of a 12MHz 286 with one megabyte of RAM and a 40Mb hard disk? You would have paid around £800 for one of these five years ago, but now? As Oscar's cynic would doubtless say, "You can't give them away, mate."

We can't print the one-word answer that springs to mind at this wisdom — it starts with "b" and ends in "s" — because giving them away is exactly what you can do. Although the market price may be minimal, the value could be enormous. Even an old 8086 is an incredibly powerful tool compared with pencil and paper, and for some, the most lowly PC can transform their life and work.

Many of the people who could benefit most from a computer — the disabled,

voluntary workers, overseas aid organisers — are precisely those who can't afford one.

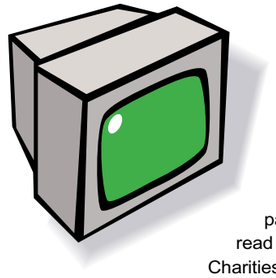
When I originally raised the subject in my *Homefront* column last January, there was considerable response both from charitable causes wanting computers, and individuals and organisations that had kit to dispose of. Even now, requests and offers are still coming in.

Since then I've discovered all sorts of imaginative ways to use equipment. Your own, or your organisation's surplus kit could come out of retirement to a new life, in ways as diverse as helping the disabled get jobs, to studying the population patterns of birds.

The train from Swindon

The Access Computer Centre at Swindon College was started in 1990 to train people with a variety of special needs in electronics and computer maintenance, with a view to helping them become more competitive in the job market.

Among the centre's trainees is a former bricklayer, who, after injuring his back falling from a ladder, was unable to continue in his trade. Within five months, he had retrained and now has a job as a computer engineer. Another trainee, a blind solicitor, is now a partner in a local practice specialising in computer law.



Since its inception, the centre, with a staff of just ten, has received a Department of Education and Employment award for excellence in training, and designed an NVQ level 2 qualification in Electronics and Computer Maintenance.

In 1994, with the help of funding from Allied Dunbar, a workshop was established. Here, the students repair and refurbish donated equipment, which is then loaned, for home use, to those with special needs or to other charities. Recipients include an author with a muscle-wasting disease who could no longer use pen and paper and a child with cerebral palsy who is learning to read with her machine.

Charities which have benefited include a local counselling service and an animal sanctuary.

Manager, Vicki Wood, says: "So far we've been very successful in acquiring very old computer equipment, such as Amstrad 1640s. Although these machines are useful, we would very much like to update some of our users and offer a better spec to new clients. For this we need 286s or better."

If you can help, contact Vicki at the Access Computer Centre, Swindon College, Old College Buildings, Victoria Road, Swindon SN1 1PT. Phone 01793-491616; email woodaccess@cccp.net.

Watch the birdie

The British Trust for Ornithology (BTO) is a registered charity run by a handful of professionals, assisted by 10,000 members. It's primarily a scientific research, rather than a conservation organisation, although it carries out surveys for institutes such as the RSPB.

The principal work consists of tracking birds by ringing, to determine populations and habits by species and location. It is a long-term business: whereas a hard winter may see a decline of 80 percent in the wren population, this isn't a great worry because they soon re-establish themselves. More alarming are the long-term trends with species such as the song-thrush declining by a small, but seemingly irrevocable amount each year.

It's also a laborious process. Two thousand volunteers ("ringers") ring birds either in the nest, or when captured, by securing a light alloy ring to the bird's leg. This has a number and a return address. The percentage of those recovered can be as high as 80 percent in a given area, but for small birds on a national level this can drop to one percent. In any case, a vast amount of data has to be processed by the BTO. Traditionally this has been done on paper, with the "ringers" giving the serial number, species, place and time, and recapturers providing the same.

Now, the British Trust for Ornithology is computerising its efforts, with its own purpose-built software; B-Ringed. This doesn't require any special computer literacy and it will run on any personal computer with a hard disk. So far the Trust has collected and passed on 50 PCs to its volunteer members, but could use 500 more.

If you can help, contact Jacqui Clarke at the British Trust for Ornithology, The Nunnery, Thetford, Norfolk IP24 2PU. Telephone 01842 750050; or fax 01842 750030.

Sound advice

Unlike the other organisations profiled here, Bill Jenkins is a one-man band. During the day, he's a toolmaker for a firm making baby equipment. In his spare time, well, in his own words: "One day I sat down and thought about my eyes and what I use them for. Have you ever tried walking around your own home with your eyes shut for half an hour?"

Having decided to help the blind, he began by transcribing books into braille for the RNIB and other organisations. Painstaking work involving not just volumes of text-entry, but also accurate formatting to maintain the braille columns.

For the past three years he's also been constructing PCs especially for blind users. Most of Bill's clients are totally blind, so display enhancements aren't feasible. Instead, he fits the PCs with purpose-made soundcards. These read each character out loud as it is typed in from the keyboard, and will also read back sentences or entire

Recycling electrical equipment

This year, some one million PCs will be thrown away in Britain, weighing around 2,000 tonnes and taking up landfill sites equivalent to the size of several football pitches. The Industry Council for Electronic and Electrical Equipment Recycling (ICER) claims the electronic waste clogging landfill sites would be worth over £50m a year if it were recycled. Only five percent is recycled at present because processing plants are expensive to set up, collection procedures and services are disorganised and few products are designed for easy dismantling; the very first step in recycling.

The government's "stick and carrot incentive" is the UK's Landfill Tax. It is due to be introduced this year on 1st October in the hope that it will encourage people to "produce less waste, recover more value from waste (for example through recycling or composting) and to use more environmentally friendly methods of waste disposal." Although it is estimated that a net revenue of some £450m will be raised by the Landfill Tax, the government may be overly optimistic to believe that existing waste management licensing laws and Duty of Care legislation will be sufficient to regulate against fly-tipping.

(Picture: Corporation of London)
Collection of old and redundant PCs for recycling

Meanwhile, the EU is considering legislation to make suppliers collect end-of-life computer equipment from end-users and dispose of it under strict environmental standards. Germany is taking the initiative and plans to introduce legislation in October requiring regulations to be passed on general waste for recovery and recycling. It is expected that a regulation for IT equipment will be in place in Germany by the end of this year or early 1997. The EU is being briefed by all members and it is hoped that there will be a decision in the autumn on whether action will be taken at European level.

Although the UK government seems to be taking a "back-seat approach", there are regular briefings occurring between manufacturers and organisations such as ICER and the DTI. The former body is also setting up recycling trials to find out what can be achieved on a voluntary basis without legislation and, therefore, if and when intervention might be required.

UK companies are coming under pressure to keep in line with new legislation and meet the demands of the environmentally-conscious consumer. And some companies are taking a pro-active approach. ICL, a founder member of ICER, is aiming to stay ahead of legislation and recognised standards.

ICL's environmental programme was formally launched in 1993 but its roots started back in the eighties when ICL established an equipment return centre in Cheshire. The D2D Equipment Returns Centre was set up at the Byley plant specifically to protect ICL's intellectual property rights and any risk of the development of an unauthorised second-hand market which could consequently damage ICL's reputation. Byley also began accepting end-of-life equipment requiring disposal from non-ICL clients and although some equipment was being refurbished and some components reclaimed, much was still going to landfill.

Unsatisfied with the end result of this process and aware of impending EU regulations, an environmental task force was brought in to revise the options available. An independent enterprise, CompuClaim, was set up to upgrade the waste material by further separation. To date, CompuClaim is able to separate some 23 different fractions from the waste. Due to the large amount of reclamation and refurbishment that Byley was able to carry out, by 1993 less than eight percent of returned equipment was going to landfill. The majority of this was made up of cathode ray tubes (CRTs). ICL has since been working with specialist recycler, Mayer Cohen, to safely dispose of CRTs.

The glass used in CRTs is coated with various heavy and rare earth metals, including cadmium which can be carcinogenic. Mayer Cohen crushes the CRTs, washes the coatings off the glass and finishes with a rinsing process. The result is a mix of crushed glass, ferrous and non-ferrous metals, along with a metal-rich type of sludge as a residue.

Further research is being carried out, in conjunction with Southampton and Bangor universities, to separate rare and heavy metals using plant fibre filtration and micro-organism digestion. Mark Burstall, Managing Director of Mayer Cohen, says that the micro-biological research is near completion and that a full-scale parallel plant for this digestion and separation process should be up and running before 1997.

Meanwhile, back at D2D Byley, ICL is undertaking a three-year environmental project with the research departments from Cranfield and Manchester Metropolitan universities. By tackling the design process with disassembly and recycling as the eventual end-of-life goals for all products, ICL aims to minimise the effects of its operations and products on the environment. For example, maximum use of clip-on parts, the marking of plastics for accurate identification and a reduction in energy consumption and harmful emissions in all processes. Innovative environmental practices led to Byley winning the Mersey Basin Business and the Environment award in 1995.

Disassembly process at Byley

As part of its Corporate Environmental Policy, ICL also expects similar environmental standards from all third parties involved with its business, including suppliers, vendors and contractors. However, the ICL environmental program is far more intricate: from distribution to packaging operations, to transport and communications. ICL estimates that its video conferencing network saves the company more than one million passenger kilometres per year.

Industry needs to follow the example set by ICL and a handful of other like-minded companies. Taking a pro-active role now will benefit manufacturers' working relationships with the environmental bodies who are providing advice and guidance to European and national governments in the framing of impending legislation.

Joanna Scott

documents, complete with formatting codes. The systems are DOS-based, and everything that is normally echoed to the screen is redirected to sound output — a DIR command, for example, will produce a spoken listing of files.

Having built a machine, Bill will pass it on to a blind client for the cost of the parts, and equally importantly, devote more of his time to training the user.

Most of Bill's raw materials, except the sound boards, which cost around £360 (plus VAT), come from donated equipment. Although he can use any PC from an 8086 upwards, faster chips such as 286 or 386 help, especially if the system is going to be linked to a scanner and OCR software. Bill says he can "…use anything, even leads. Monitors, of course, aren't necessary but they do help me in setting up a system."

If you have anything lying about that might help, you can contact Bill Jenkins at 72 King's Road, Glemsford, Suffolk CO10 7QL. Telephone 01787 280629.

After Ceausescu

The Cleaford Christian Trust supports a number of organisations in Brasov in Romania, including the Children's Hospital, hospices and schools.

So far, the trust has shipped over 20 machines, and has not even reached the staff at the schools, let alone the pupils.

As organiser, Angus Cleaver, states: "We are finding that in practice a 386 is the minimum specification as it is often necessary to run Windows. Our users speak either Romanian or Hungarian, both of which have lots of accents, so East European Windows, plus East European Word, is becoming more popular. For the same reason, we concentrate on inkjets or bubblejets. Dot-matrix usually lacks sufficient definition for the accents, and lasers are too expensive to run.

"A lot of the work is translated, in view of the lack of literature in Romanian so the output needs to be of a reasonable quality.

"If we receive a batch of machines, we will run another training course as we did in January 1994, to ensure that recipients are able to put the kit to good use. Last time we found great enthusiasm. People came from all over the country when they heard we were teaching.

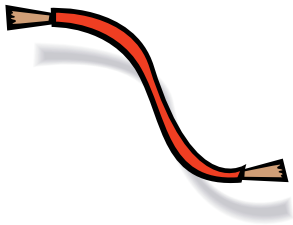
"We taught word processing and a simple flat file database, which at least allowed people in schools and hospitals to begin keeping computerised records. There is still a great deal of bureaucracy in Romania. People, like the pastors with whom we work, are constantly being asked to produce official documents, hence the value of word processing."

Incomes are very low, so a computer is beyond the means of most individuals. A junior doctor earns the equivalent of £27 per month, a consultant £60, but food prices are similar to those in the UK.

The Brasov Children's Hospital is heavily in debt to drug companies and often cannot treat the patients for lack of stocks. As a Brasov doctor, training in the UK said: "Sometimes we know how to treat a patient, but do not have the drugs. All we can do is pray that they don't die on our shift."

You can contact Angus Cleaver and the Cleaford Christian Trust at 46 Hazell Road, Farnham, GU9 7BP. Or telephone 01252 717166 or email 100716.3727@CompuServe.com.

Getting rid of redundant equipment



The worst place for your old PC to end up is in a landfill site. If you don't want to donate it to a charity, you can get some cash for it at a computer brokerage. Most of these companies specialise in sourcing and finding homes for second-hand equipment either as complete units or as spare parts. Many also run their own repair centres.

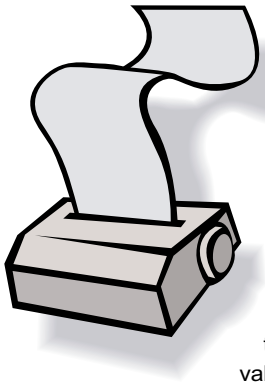
4th Party Services is a Hampshire-based company running one of the larger accredited hardware "support centres" in the UK. It claims to be able to supply spare parts or upgrades for virtually any machine ever produced; even the most ancient models. 4th Party will also part-exchange your machine for another system, in some cases even if your machine is faulty.

Alternatively, spare parts can be bought to give you a working machine or the company will offer an amount to purchase the faulty equipment from you. Earlier this year, the Ministry of Defence used 4th Party to dispose of 25,000 items of redundant computer hardware. 4th Party Services tested and refurbished the equipment to BS 5750 standard and is now selling the machines and parts in the second-hand market.

Meanwhile, redundant equipment that cannot be used to maintain old machines is sent to Mayer Cohen in South Wales for recycling. Rebecca Reynolds, 4th Party's customer services and marketing manager, says Mayer Cohen was chosen because "It is one of the few companies which not only recycles metals down to their core elements, but also recycles plastics. Mayer Cohen also has the facility to dispose of screens which contain toxic films."

Joanna Scott

● *4th Party Services 01705 230 518*



The good book

The list here is by no means exhaustive, and if it were, we probably wouldn't have room to print it. The Charities Aid Foundation (CAF), itself a charity, exists to enable individuals and organisations to improve the quality and value of their donations. It also provides services to other charities to help them raise and manage their funds more effectively.

To these ends the CAF has published "*Waste not…*", a 150-page book listing charitable organisations that accept recycled items, both for end-users and for resale. As well as over 200 charities that accept computer hardware and software, the categories include everything from air miles to old photographs with nearly 1,000 organisations listed by category and region. Note that the CAF doesn't, itself, collect recycled equipment so please don't send any items there.

"Waste not…" costs £5.95 from book shops (ISBN 1859 340 067) or you can contact the Charities Aid Foundation, at Kings Hill, West Malling, Kent ME19 4TA. Telephone 01732 520062. Web site www.charitynet.org.

In brief: 12 more organisations you can help

Who?	What?	Why?
Bannisterbrook House, Pearfield Leyland PR5 1HZ. **Contact: Ken Lockwood, 01772 458744**	A printer — can collect	To produce a newsletter for 34 sheltered flats, a monthly leaflet and handle subscriptions.
Computers for Development, 12 Glentwood Road Redland Bristol BS6 7EG **Contact: Andrew Gulland, 0117 9248549**	286s or better	For use in Zimbabwe schools. Really ancient kit impractical as it costs £50 to send a machine. Donations to cover transport are also welcome.
East Leeds Women's Workshop, **Contact: Margaret Fowler** **email 101553.2106@compuServe.com**	386s or better	A voluntary sector, non-profit making organisation that trains women, over 24-years old, in computing. Of the eight computers in the workshop, four of them are XTs: fine for teaching the basics but totally irrelevant to the work placements organised for the trainees.
Disabled Drivers Association, Ballindine, Co. Mayo, Eire **Contact: 00 353 94 64054;** **Fax: 00 353 94 64336**	PCs, printers, modems	In addition to providing support and a residential school for disabled drivers in Ireland, the association runs a training centre offering both residential and home-delivered training to C&G standards in computing and office skills. Donated equipment is lent to students.
King's Church, Hempstead Lane Uckfield, East Sussex **Contact: Chris Gray 01825 765115** **or email cgray@geis.geis.com**	386s, peripherals and software	Works with the Romanian charity, Vestea Buna, to provide help for the disabled. "Under the Ceausescu regime, these were non-people, and some Orthodox Church members still teach that disability is a divine punishment. Help us to help them regain respect."
Living Options Wirral, Cavendish Business Centre Brassey Street, Birkenhead **Contact: Phil Kerr** **0151 644 6601 Philip_Kerr_at_wmc__brl** **@wmcmail.wmc.ac.uk**	P75 systems, laser printers, scanners	Living Options Wirral is a user-led charity for people with physical disabilities. Phil is setting up a web site and is in dire need of upgrading the current equipment to cope with writing home pages and a monthly newsletter, running a mailing list and allowing the clients to surf.
National Deaf Children Society, 15 Dufferin Street, London EC1Y 8PD **Contact: Elise Wynn or Mark Astaripa** **0171 250 0123**	386s and printers	To set up ten regional co-ordinators who advise deaf children and their families.
Scope, 29 Moor Street Worcester WR1 3DB **Contact: Kevin Elliot 01905 29824?** **or email kevin@kevinell.demon.co.uk**	286s and better, Macs, printers, scanners	Formerly known as the Spastics Society, Scope works with people with cerebral palsy and other disabilities. Equipment is needed for running the charity and as aids for disabled staff.
Special Needs User Group, 42 St Helens Merseyside WA10 3BJ **Contact: Jeff Hughes 01744 24608**	BBCs (especially peripherals), 386s	National network with a mix of abled and disabled members. It obtains computers for disabled people and provides technical support.
The Computability Centre, PO Box 94, Warwick CV34 5SW **Contact: 0800 269545**	Any equipment welcome	An organisation that supplies computers to the disabled.
The Freedom Centre, St George's Avenue Sheerness Kent ME12 1QT **Contact: Bob Clarke 01795 666233 or** **email bobclarke@cix.compulink.co.uk**	PCs and printers	A well-equipped computer room with a network provides training in information technology for around 60 people with disabilities. We are looking for suitable hardware to loan to members so that they can continue their learning at home.
Winged Fellowship, Angel House 20-32 Pentonville Rd London N1 9XD **Contact: Paul Sample 0171 833 2594** **Paul_Sample@cix compulink.co.uk**	386s and printers. Can collect in the south of England	Winged Fellowship is Britain's largest voluntary provider of residential respite care for people with severe physical disabilities and their carers. It provides 6,500 respite breaks each year at five purpose-built centres. The computers will be used to help with general administration and fundraising.

Cartridge care

Woodland Trust planting trees

When you replace your toner cartridge what do you do with the redundant one? The simplest solution is to throw it in the bin, but in so doing you have ensured its redundancy and added yet another one to the six million laser toner cartridges that are thrown away each year in the UK. Laser toner cartridges cannot be incinerated because of the toxic waste they would produce. They won't degrade when left in a landfill, regardless of time.

The sensible solution is to recycle used cartridges but the onus still rests on the end-user to return the cartridges because without this initial effort, there can be no remanufacturing industry. Research varies, but it is estimated that the UK recycles less than 20 percent of laser toner cartridges. However, were the UK to follow in the footsteps of the US, where 35 percent of toner cartridges are currently recycled, the UK market alone could be worth £400m at today's prices.

The commercial viability of production on such a grand scale has not gone unnoticed. The UK Cartridge Recyclers Association (UKCRA) has recently merged with Recyclers GB (The Association of British Cartridge Remanufacturers) and aims to strengthen controls in the laser cartridge remanufacturing industry. Members are remanufacturers who have recognised the need for an industry standard, and thus conform to meeting minimum codes of remanufacturing practice and offer warranties.

Other remanufacturers believe the independent quality standards set by the International Standards Organisation are far more rigorous and better recognised, Kores Nordic and Mercia Laser being two accredited remanufacturers conforming to ISO9002 in their remanufacturing processes.

Kores operates a collection scheme with selected resellers which includes funding of CLIC (Cancer and Leukaemia in Children), where up to £2 is donated for every cartridge returned. A free return collection service is also available for all empty Kores cartridges. When the empty cartridges are ready for collection, simply dial a number and a national carrier will call to pick them up (details can be found in every Kores toner cartridge pack). By the simple use of a barcode, Kores has also developed unique cartridge tracking software which allows both Kores and its dealers to monitor sales and returns from the point of remanufacture through to the end-user and back again. Each remanufactured cartridge comes with a one-year guarantee against defective materials or workmanship.

The National Deaf Children's Society (NDCS) has had a printer cartridge recycling scheme in place for over two years which involves some 200 companies. So far, it's raised between £4,000 and £5,000 a year with the recycler donating up to £6 to the NDCS on some laser cartridges. When returning the cartridges, the NDCS emphasises the importance of protecting the cartridges in the post as damaged ones cannot be recycled. Send them, wrapped and in a cardboard box marked "fragile", to Mercia Laser Ltd, Wharf Street, Warwick CV34 5LB. Mark the pack with "Donated on behalf of the NDCS" to ensure that the society receives the appropriate donation.

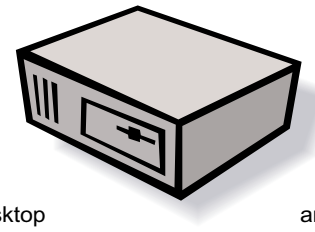
In some cases, Mercia Laser, which is based in the Midlands, will arrange for collection of the used cartridges. If you buy back the recycled cartridges, you could also save money as well as further contribute to the NDCS. Mercia Laser will give a further donation for each recycled cartridge they install, providing the business has been procured via the NDCS. The recycled cartridges are guaranteed to perform as well as, if not better than, original cartridges and Mercia conforms to the strict quality standard ISO9002. Should a customer find this not to be the case, then the cartridge will be replaced free of charge or the price refunded in full.

The Royal National Institute for the Blind has a joint scheme with The Cartridge Company, one of the UK's leading recyclers of laser and inkjet cartridges. Depending on the specification of the cartridge, between £1 and £5 will be donated by the Cartridge Company and by participating in the scheme you could substantially support the RNIB.

Office Supplies Team (OST) runs a scheme to benefit the environment. For every cartridge received which is suitable for recycling, the company pledges to pay for the Woodland Trust to plant a tree. Over 5,000 trees have already been planted in the North Yorkshire Moors National Park and other sites are in line to benefit as the scheme progresses.

Joanna Scott

Begin at home



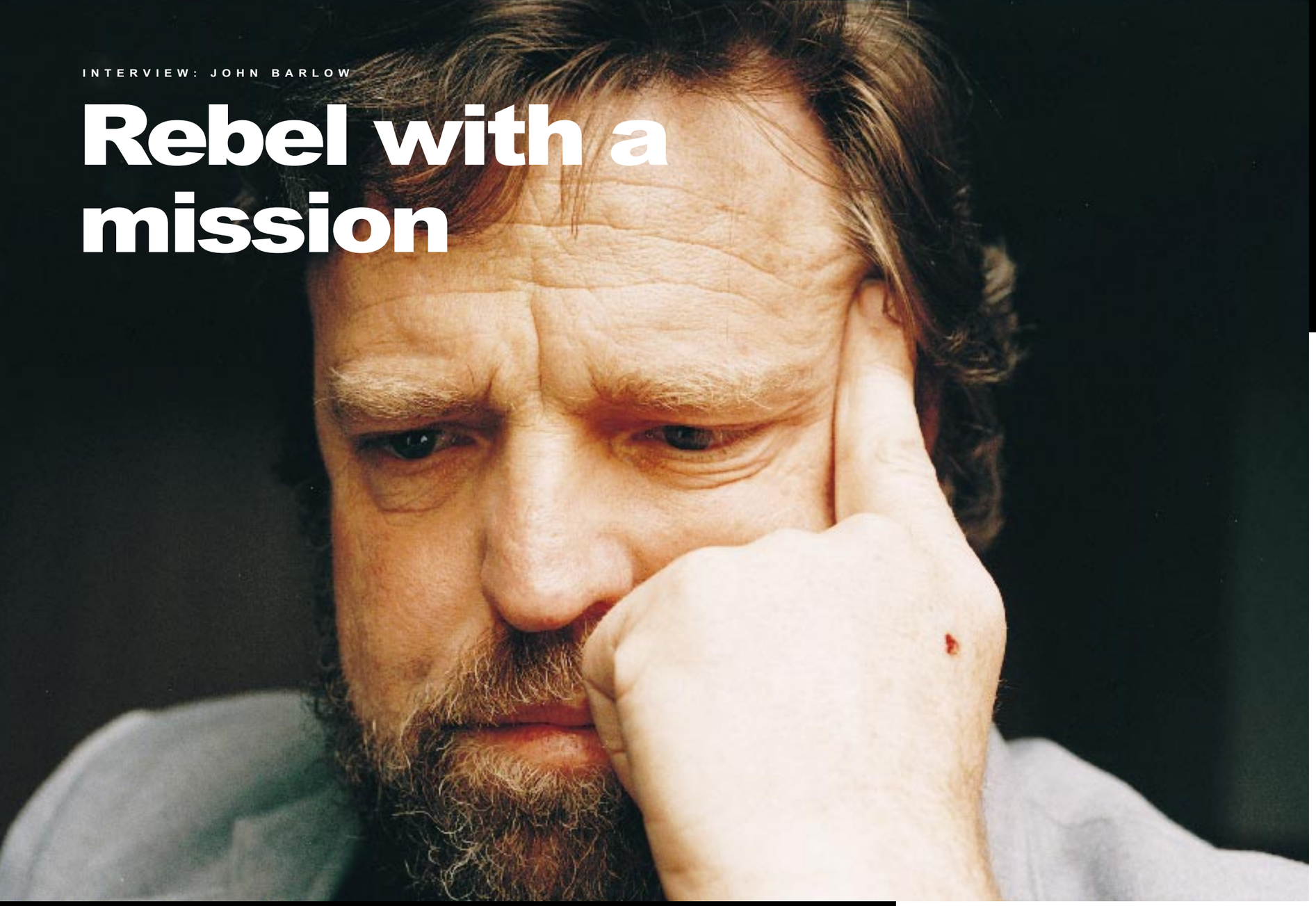
Most of the charities listed here that use recycled equipment want to do much the same things as any other user — word processing, maintaining databases, desktop publishing and so on. So, although they may not need the latest in Win95 technology, it's doubtful whether they could use your old PC with 8in floppy drives. You can be sure, however, that someone, somewhere, wants it. Derek Wilkins of Sussex was one of the first to reply to the original request in my *Home Front* column, but couldn't find a taker for his Amstrad PCW. Undaunted, Derek placed an advert in his local freesheet, and "…was inundated with local charities wanting any sort of computer, mainly to use as word processors and databases" His PCW now enjoys a new lease of life with a local Scout Troop. Other local-based charities worth approaching include the Lions, churches, branches of Age Concern and Cheshire Homes.

● *If you have kit to dispose of, please contact the organisations directly; don't send it to PCW. If you'd like your organisation to be added to the "wants" list, please contact me either by email (timn@cix.compulink.co.uk), or by post c/o PCW. Please include a contact name, address, phone number and email address if possible. Specify the kit being sought and for what purpose. If you have kit to donate and want an updated "wants" list, contact me as above.*

PCW Contacts

Kores Nordic 01279 454455
Mercia Laser 01926 499533
Louise Maunder, NDCS 0171 250 0123
John Sterry, RNIB 01222 224 574
Susan Tennent, Cartridge Company 0800 080808
OST 01274 306787
Woodland Trust 01476 74297

Rebel with a mission



Pioneer John Barlow coined the terms Net Culture and Net Religion. In his Declaration of the Independence of Cyberspace, he calls on governments to keep well away. Wendy M. Grossman got just close enough.

John Perry Barlow is distantly related to the man who invented the Browning rifle and he grew up on a Wyoming cattle ranch. He looks the part: beard, jeans, cowboy boots, black neckerchief. Mostly, it's the hands. You can feel the callouses when you exchange greetings. And the politics. If the Net has an exuberant, rebellious, libertarian streak, Barlow could have invented it. His grey, Western-styled jacket, which he wears to speak at conferences, sports the blue ribbon of protest against the Communications Decency Act (CDA).

Now 47, Barlow has led more lives than most people manage in twice the time. He graduated from Wesleyan University, a good liberal arts college in Connecticut, with a degree in comparative religion and got into Harvard Law School. Something seems to have twitched in his head at that point as he turned down his place there and headed for India to write a novel. He never finished it: he hates writing prose ("I'd rather pump septic tanks"). When he came back after a year, he narrowly escaped getting a job as a promo man for Warner Brothers, before he began writing lyrics for some of the Grateful Dead's best-known songs, such as "Cassidy" and "Throwing Stones" while spending 17 years in debt to the tune of a million dollars, running the family cattle ranch. Somehow, in all this, he also spent a (slightly different) 17 years married and had three daughters, before he and his wife separated in 1992.

He got on the Net almost as soon as there was a Net. He told me: "I found it to be an opportunity for people who had been de-socialised and excommunicated — that is to say, removed from any sense of community — to gather back together in some new, social space, and then to come together physically. Many of the systems with which I'm familiar have active online communities, as well as active meatspace communities." (Meatspace: bodies).

At the end of Barlow's email messages he lists addresses in New York and Wyoming, followed by phone numbers for "Where I am in meatspace today". Since he co-founded the Electronic Frontier Foundation in 1990 with Lotus founder, Mitch Kapor, he's done a lot of travelling, lecturing and writing on the subject of the Net and its future. All that came from distributing his writing on the Net for free, starting with his 1990 piece "Crime and Puzzlement", which recounted a visit from an FBI agent who thought Barlow was a hacker but couldn't work out what his crime was meant to be.

Get Barlow talking, and the "I" in that location in meatspace sounds like it was lucky to get there in (presumably) one piece.

"The body is wheeled around by a committee," he says. "I don't know about you, but I find that I've got a committee in my head that's the equivalent of the British Parliament. The back benches are noisy. There's an awful lot of argumentation going on in here. It might add up to some kind of unified self that appears to be a central personality, but that is, I think, an artifice that's imposed by the body." For Barlow, "multiple

PCW Photography by Eleanor Bentall

personality syndrome is not a disorder; it's the common state of things."

Demons arguing in the head is a vital theme in the work of CS Lewis, one of Barlow's favourite writers and whose books he began reading at the age of nine. He has another bond with Lewis "through love and tragedy" because when he talks about the significant people in his life, one he always mentions is Dr Cynthia Horner. He had expected to marry her until she died suddenly of an unsuspected heart ailment on an aeroplane flight in 1994. He still mourns her publicly — in person, in his writing, and on his Web page (http://www.eff.org/~barlow).

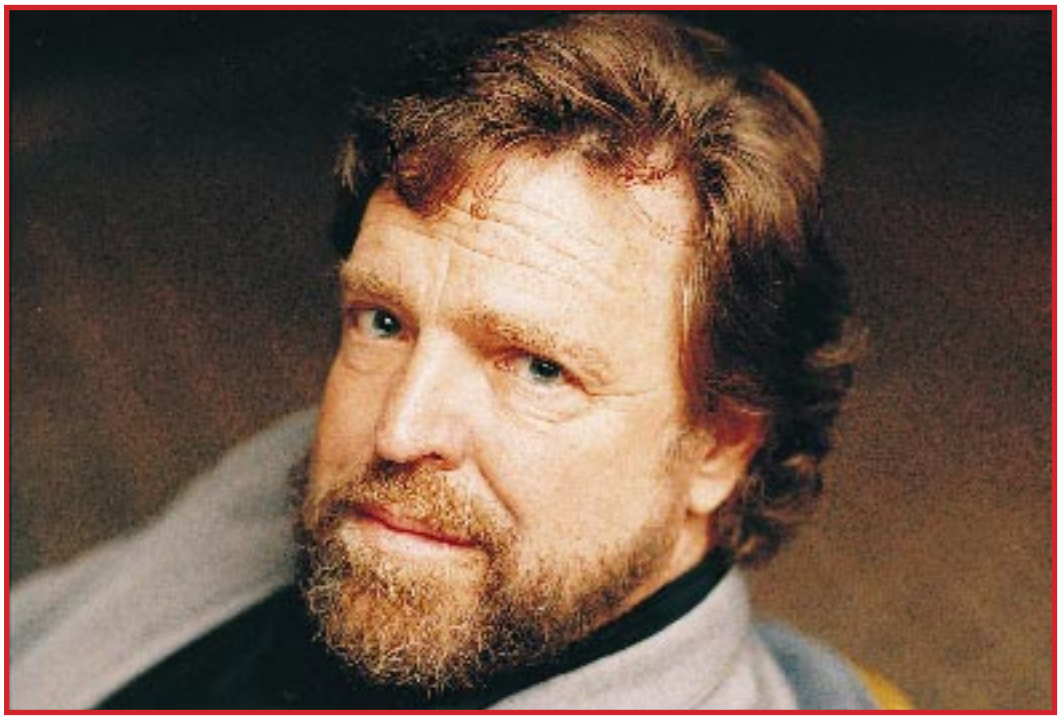
One of his other heroes is Thomas Paine, who he says, "was a God-like figure to me, even before it was fashionable." Which may be why he wants to "dump tea into the virtual harbour," as his Declaration ran.

There's this thing about the American West: they hate government differently there. This is an area of the country where traffic lights are seen as too damn much government interference. Barlow fits right into that way of thinking, which goes right back to the days of the earliest settlers, when you established your rights to land by staking your claim and living on it for seven years. The result: he's come up with the notion that cyberspace should be its own sovereign state. If it's going to be governed at all, he argues, it should be by its own citizens, not the "Congresscritter", made up of people who've never been on the Net.

"One reason I like cyberspace is because it's a good place to grow a conscience. Human beings have tended to use government in *loco parentis*, long past the point where anybody ought to have a parent who controls their behaviour. Ultimately, decent behaviour ought to rise out of a sense of conscience and ethics."

But it can be argued (and many do) that the key issue here is size and scale.

"That's the trouble with you liberals," he says, leaning forward and punching each word in the air with one large finger. "You have no faith in people." He can say that because, while my car is locked up in front of my locked house on the outskirts of London, his truck is sitting with the keys in it at an address he'll readily give you in Pinedale, Wyoming, right in front of his house, also unlocked. It may be a risk, but it's a matter of principle. But there again: Pinedale is a tiny place and he knows everyone.



"Good wouldn't mean very much without evil. I don't think we're proceeding into some kind of Utopian realm, where there is no longer any evil among us because I think that part of the reason why human beings are put here in the first place is to learn about good in the presence of wickedness."

Barlow codified some of these ideas into a Declaration of the Independence of Cyberspace, which flew around the Net in February 1995, a day or two after Congress passed the Telecoms Bill, and with it the CDA.

"I declare the global social space we are building to be naturally independent of the tyrannies you seek to impose on us," he wrote to "Governments of the Industrial World." He went on: "Governments derive their just powers from the consent of the governed. You have neither solicited nor received ours. We did not invite you. You do not know us, nor do you know our world. Cyberspace does not lie within your borders."

The "natives" on whose behalf he was speaking weren't entirely welcoming to the Declaration: some going so far as to describe it as "embarrassing" and "naive".

"I got slammed by a bunch of people," he says now. "I got hit hard by people who would ordinarily be friends. But you know, it was mostly people trying to debug my code, in that hacker mentality of 'Well, but you know, the Internet really was started by the government. You can't say the government doesn't have anything to do with it.' It was like that. It wasn't that they disagreed with it in substance; it was that they disagreed with it in particulars, which is hardly the point."

Instead, he'd argue that the government started the Net, then lost control of it and is now trying to get it back. "I think that we will have lost something precious if we allow that to happen."

What's odd is that Barlow doesn't see commerce as a threat to the Net.

"People have a resistance to commerce that's based on the extent to which it's been conducted by organisms that are not human, that have little regard for human beings, that eat human beings on a regular basis, that feed on them.

"And they assume that if those institutions are there, then it will be business as usual. I don't think it will be business as usual at all, because I don't see that those institutions have any advantages in cyberspace — in fact, I can see that they have many disadvantages.

"They're much too slow. They're too non-adaptive. Much of what they do as institutions is to order the flow of information in a fashion that is taken care of by the Net, automatically, for a lot of much smaller entities."

It's tempting to argue that the Web will change this state of affairs, as it's likely to be the large organisations that can build the biggest and fanciest Web sites. But Barlow doesn't think that makes a difference, even in a future of Java applets and virtual reality.

"I think that interaction with cyberspace will have a more devastating effect on those organisations (large corporations) than they will have on it. I think that the culture that lives on the Net is much more infectious than anything that lives in a large, industrial-period organisation."

All those libertarians: there is a streak on the Net that, as Barlow says over and over, seems to defy authority and rebel against regulation.

"There is such a thing as Net culture," he says. "There is such a thing as Net religion. And it has scaled astonishingly well." Net religion?: "Believing that something is going on here which is an almost divine manifestation."

Here's Barlow's theory about that: "Religion is obviously involved, because any time you've got a large portion of the human race going to a place where they can't take their bodies, you're talking about religion. What else has religion been about?"

On the CUTTING EDGE

Welcome to Cutting Edge, the section in *Personal Computer World* that combines our regular reviews of games, books and CD-ROMs, with features keeping you right up to date with computing and the Internet.

We now have the most comprehensive coverage of these topics available in a general computing magazine. Stay with us and we'll take the pain out of keeping on the cutting edge.

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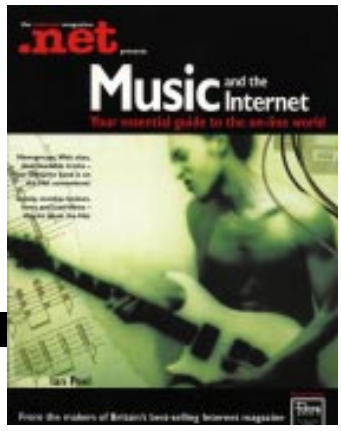
Star Trek: Screenplay *255*



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CUTTING EDGE

Waiting online at the cybermarket

With the increasing popularity of electronic banking and other services, Michael Hewitt considers the limitations of online shopping in Britain.

ABOUT A YEAR AGO, I wrote a survey of the online shopping scene that painted a fairly bleak picture.

Back then, the goods on offer were the type of things that would embarrass even the Innovations catalogue. In any case, there weren't many UK retail outlets (or US ones, for that matter) that seemed particularly interested in the concept. At the same time, the few potential customers that existed were being scared off by fears of pimply hackers grabbing their credit card details and doing a Nick Leeson with them. However, I ended with the hope that, in the near future, the situation would improve. But now, 12 months later, it *is* the near future and, unfortunately, it hasn't.

Despite major advances in online security, an increase in the number of online retailers and a greater public awareness of what the Internet actually is (although only two percent of the UK public has access to it), the ring of virtual tills is still a mere tinkle. So why do most consumers still prefer going into shops on foot rather than online?

The virtual supermarket

The supermarket is an obvious candidate for the virtual treatment. How much better to be able to order your baked beans via a PC rather than having to navigate a loaded trolley through aisles crowded with slow-moving pensioners and screaming brats. So is anyone taking the idea seriously?

CompuServe's UK Shopping Mall. Orders can take up to 28 days to arrive

In the US, online supermarkets are, if not exactly taking off, then at least hovering slightly above ground level. The Smart Food Co-op (http://foodcoop.com/), for example, serves the Massachusetts Institute of Technology (MIT) campus and its immediate environs in the Boston area. Although it's got a colourful home page with a graphical representation of a shopping trolley, it doesn't do anything *excessively* dweeby, such as saying: "Click here to see . gif image of carrot". Instead, customers browse textual product listings, searching goods by alphabetical order or by category: there are over 1,500, including meat, dairy products, seafood and vegetables. You can enter the word "pasta", for instance, and the system will display a list of all durum wheat-related products. Then you simply click on those you want, and the selected items are "loaded" into your virtual shopping basket. Thereafter, if you live on the MIT campus, the stuff will be delivered to your door. If you live nearby, you can collect the packed grocery bags from a central depot. Payment is cash on delivery.

Not on the Internet itself, but online, is the Baltimore-based Metro Food Markets. Every month, the company distributes CD-ROM based copies of their "Virtual Shopping Program" to local addresses. Whenever a customer gets the urge to purchase, he fires up the program which automatically dials into Metro's computer and downloads the latest price list. This done, he can log on, browse virtual aisles and put goods in a virtual shopping trolley. When the shopping trip is complete, the order is transmitted to the Metro store that's closest to the customer and he then collects. Otherwise, he can have it delivered for an additional $8.

How depressingly different it is in the UK. Although Sainsburys and Tesco are on the Web, the only goods they currently sell online are booze, flowers, and the occasional tacky gift item. And according to them, this is the way things are likely to stay. Why? Quite simply, it all boils down to delivery problems. And a major cultural difference between here and America.

For years in the US, people have been able to go into supermarkets, make their purchases, and then have them delivered to their door. So the all-important distribution infrastructure is already there — not so, here. If online grocery shopping is going to work in Britain, the major supermarket chains are going to have to invest millions in vans and trucks to get their beans and carrots to us. To be quite honest, I'm certain they'd rather spend the money building new out-of-town hypermarkets. So I suspect that if online grocery shopping ever does make it big this side of the pond, it will be entirely due to the efforts of independent outfits, such as the "Supermarket on Wheels" (softcare@areti.demon.co.uk) that I discussed in a my *Sounding Off* column a few months back.

The electronic mall

So much for the groceries. Now for the non-perishables, starting with CompuServe's Shopping Mall. This first came onstream in 1985, and now has several hundred registered merchants. You can buy everything here, from computer software through to a used car. According to CompuServe, this is the only online shopping service that's actually making any money. Regarding its success, it cites factors such as convenience and the wide range of discounts on offer.

It's all very US-orientated, of course. Helpfully, though, for those of us who live outside the US, there's now a separate category for retailers who, for a fee, will ship abroad. By purchasing in this way, you can make major savings on items such as CDs and software packages which, in America, are usually much cheaper than their UK equivalents. The only fly in the ointment is that HM Customs & Excise will sting you for VAT and duty once the goods arrive in Blighty.

With this in mind, last year CompuServe started up the UK Shopping Mall, where you'll find familiar British high street stores such as Virgin, Selfridges, PC World, Dixons and Tesco. They sell everything from CDs and trinkets through to computers. Unfortunately, the prices of software and hi-tech equipment are, discounts notwithstanding, *very* British: i.e. take the US dollar price and substitute a pound symbol for the dollar.

So what's it like? It reminds me of one of those CD-ROM recipe books, except instead of searching by ingredient or recipe name, you use product groupings such as "hi-fi equipment", or keywords. The items will then list themselves in text format, together with prices — eventually. Unfortunately, the glossy WinCIM graphical interface is infuriatingly slow, especially if you insist on viewing .gif images of the products. For instance, it took me all of five minutes just to enter a store, browse the goods and make one selection. If I'd actually decided to buy it, it would doubtless have taken me a few more minutes to enter my Visa details. In the interim I'm adding both to CompuServe's and BT's coffers.

Delivery is another bugbear according to many who've used the system. Most retailers promise they'll get the stuff to you within five working days. Virgin Megastore, which sells CDs and videos, says it will "try", but warn that a 28-day wait could well be on the cards. Given the evanescent nature of modern pop stars, a delay of one month could mean that the group in question has gone out of fashion by the time their CD arrives. All of which — taking into account snail-on-Mogadon software performance, not particularly competitive prices, and delivery delays — makes the whole concept a waste of time in my opinion, at least for the present.

Ordering wine from Sainsbury's. At the moment, wine is one of the few things, in the way of online groceries, that you can buy

Shopping on the Net

Internet shopping has been described as catalogue shopping *par excellence*. That's a load of rubbish, of course. You don't pay by the minute for browsing a catalogue. Nor do catalogues suddenly and inexplicably lock up as their pages are turned. There's no "*excellence*" about it. Most Internet users, buyers and sellers alike (except the proselytising Wavey Davey types), acknowledge this.

Late last year, for example, *The Wall Street Journal* carried out a survey of major retailers and asked them why they weren't particularly interested in selling online. The Internet was too slow, said many. It wasn't secure enough, said others. Then *The Journal* rounded up 1,013 netsurfers and asked much the same thing. They weren't too concerned about the speed (or maybe they were just resigned to its sluggishness), but they did complain that online retailers weren't offering attractive enough discounts. They argued that the absence of a rateable brick-and-mortar shop meant that retailers didn't have the usual overheads, therefore their goods ought to be cheaper. And, most heinous crime of all, they said, most retail web sites were "boring".

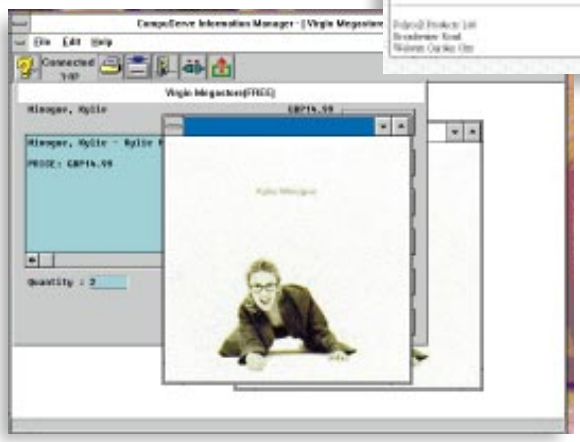
Indeed, if you want to see and experience boredom of the paint-drying variety, check out the Polycell Home Page (http://www.polycell.co.uk). In fact, to be quite honest, check out most of the retail web sites and suffer a similar experience. I won't bore you with a blow-by-blow description of the sort of retail sites that are online and what can be bought from them. You can do that for yourselves by going to "The UK's most authoritative, fully searchable database of the world's best (retail) web sites", (http://www2.emap.com/review/Shopping.htm). Suffice to say, most of what they're flogging is either (a) tack that no-one except a devotee of the Franklin Mint would be interested in; or (b) the sort of stuff that, although normal enough, no rational person would *dream* of buying online, sight unseen: cars, clothes, houses and jewellery for instance. Cyberspace lacks that essential "touch and feel".

It is a fact that the Internet is too slow to be taken seriously as

CUTTING EDGE

Right *The Polycell Home Page: not exactly excitement by the byte*

Below *Buying a CD at Virgin's online Megastore in CompuServe's UK Mall*



a shopping medium. The majority of the online goods are those cranky things you find in shops like Times Past or the Innovations catalogue. Even when they're not, you get the feeling that the retailer is only advertising them on the Internet to appear "hip" and appeal to the fringe "yoof" sector. I doubt — *know*, in fact — that they don't make many sales this way, nor do they expect to. Anyway, for an incisive comment on Internet shopping as a whole, I can do no better than point you to the Bovine Scathalia website (http://www.adnetsol.com/bovine/bovine.html): "The chance to buy… 100 percent bullshit."

Software sales

Now here's an area that could benefit from the Internet. I don't mean the shrink-wrapped programs (although packaged software constitutes a large proportion of CompuServe's Shopping Mall sales). I'm referring to the software itself. Why hire a courier to transport a large box containing 15 Word for Windows disks and three large manuals when the stuff could be sent across the Net in half an hour?

In fact, there is now a move towards distributing software in this way. Companies such as Sun and Oracle are looking at the idea of software houses holding their applications online. Having dialled in and uploaded their credit card details, customers will then be given access to the appropriate program's file directory, at which point they simply download. What sort of dent this makes in the multi-billion pound world shrink-wrap market remains to be seen.

One fly in the ointment is that if people start to regularly entrust their credit card details to the Internet, isn't some enterprising crook going to attempt to get at them? Exactly how secure is the system?

Internet security

Actually, it's hard to understand why so many people do get cold sweats about entrusting their beloved Visa card details to the Internet. After all, it's far more risky to send those same details over the phone when booking theatre or cinema tickets. Yet the majority of us do it without a second thought. And one frequently hears horror stories of thieves going through restaurant dustbins and digging out the credit card carbons for nefarious purposes. But for whatever reason, the Internet is regarded as a higher risk. Because of this, a number of companies have recently taken initiatives to try and beef-up credit transfer security.

Netscape Communications, which pioneered the use of cryptographic technology in web browsers and servers, now employs a system called Secure Sockets Layer (SSL). This protects financial transactions by encrypting the messages with a secret key: a random number that's known only to the send-and-receive machines. So unless the would-be hacker has complete details of the program's encryption and decryption algorithms, he, too, is going to have to try entering numbers randomly to see if one fits. Given that there are millions of permutations, he stands more chance of winning the National Lottery.

CUTTING EDGE

Another recent development is courtesy of Visa International and Mastercard. Last March, the two companies agreed on a standard specification for sending secure credit card transactions over the Internet. Called Secure Electronic Transactions, (or SET for short) it should be available for public use in the fourth quarter of this year. If and when it is, Netscape has said that it will incorporate the technology into its own servers. With those two Big Boys on board, it can't be long before other credit card companies and banks sign up.

It therefore looks as if worries over security could soon be a thing of the past. With that concern out of the way, all the Internet operators will have to do is get the damn system to work reliably and at a reasonable speed. If, by some miracle, they do, then commerce over the Net (currently a trickle) could become a flood. But don't hold your breath waiting.

Home banking

Home banking is something that everyone (banks *and* their customers) seems to be in favour of. Most people don't like having to interact with a real-life bank teller or bank manager. Even if there's a hurricane blowing outside, the majority would rather queue at the ATM machine and get drenched, rather than go inside and write a cheque. The banks, of course, are delighted. If they can dispense with the human element, they can cut costs and stay competitive in what's become a dog-eat-dog financial market. Hence the current proliferation of computer-based home banking services.

In the UK, the Royal Bank of Scotland started the ball rolling back in 1988 with their HOBS system. In those days, home PCs weren't as common (or as cheap) as they are now, so the bank supplied customers with a tacky little terminal — a sort of Minitel lookalike — with which to access the service. Now, however, most people go in on a conventional PC-and-modem setup. The software, which now runs under Windows, comes gratis for RBS customers. The only disadvantage is that you can only access transaction records that were completed on the previous day of business.

The Bovine Scathalia Web site: genuine bullshit, ordered online

HOBS allows users to log directly into the Royal Bank's central computer via a local telephone call. Once in, you're able do everything you can with a normal bank account: check your cashflow, pay bills and set up standing orders, for example. Virtually the only thing you can't do is physically suck money down the phone line. However, once the concept of the "rechargeable" cash card, like the Mondex, becomes more accepted, this will no doubt change, too.

New on the scene are Lloyds and Citibank. Last April, both signed deals with palmtop manufacturer, Psion. Customers need a Psion 3a, a 3Link modem and the special Lloyds software. Once they've plugged everything together and dialled in, they can send, what are effectively, electronic cheques to anyone in the UK across the UK's bank clearing network. Furthermore, unlike the paper variety these electronic cheques clear on the same day, which might or might not be an advantage, depending on your cashflow situation. You can also view your bank statement, check payments and so on. An interesting feature of the software is that it will make predictive cashflow analyses based on current spending patterns. So, for instance, if you've been overdoing it at Thresher's this month, the program will tell you that you risk bankruptcy in two months' time if you continue in these profligate ways.

The Citibank/Psion deal operates in much the same way as the Lloyds service. In addition, however, it allows well-heeled customers to view bank statements on multi-currency accounts as well as move money (in different currencies) between accounts. The service should be fully launched later this year, and will cost £49 per annum.

On the desktop PC side, CompuServe recently announced that it's got into bed with the TSB. Last May, the two organisations unveiled their home banking system which operates 24 hours a day. To gain instant access you have to be an existing TSB customer. But as only two percent of TSB's customers actually have CompuServe accounts, the overall strategy would seem to be to convert the existing C-serve userbase over to the TSB. Currently, and perhaps surprisingly, it takes up to one calendar month to open a new TSB cheque account and sign on with PC Banking.

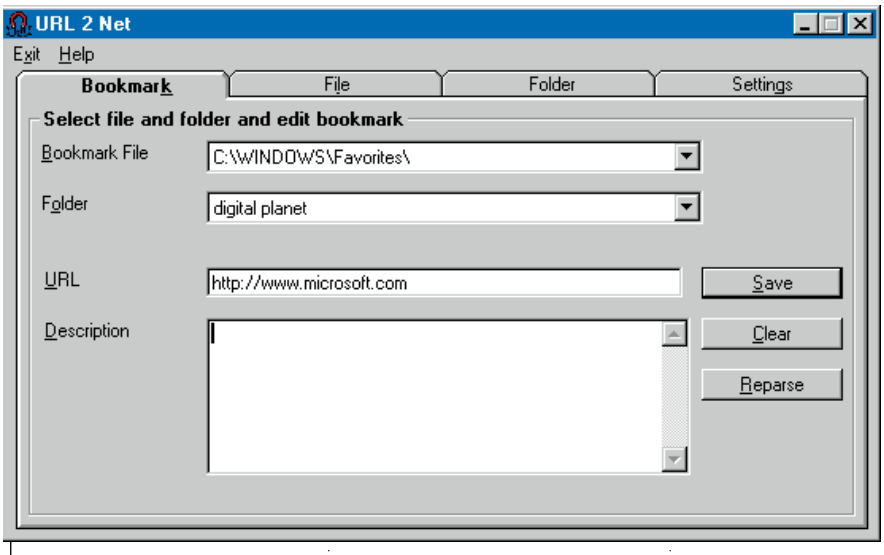
PC Banking isn't on CompuServe itself but on a web site that's only accessible via CompuServe. You must therefore have WinCIM's winsock set up before you can access it. When you dial in and "GO TSB", you have to key in both a unique PIN number and a password. To help maintain security, this password is changed periodically. The user can change it himself at any time.

Thereafter, you have the normal range of bank services. Customers can, for instance, pay bills, transfer money between accounts and buy discounted goods using the TSB Trustcard. But the main virtue of the system is that it operates in real time. In other words, when you call up a balance it is that current day's, not the previous day's as with all other banks. You can therefore deposit money into an account and then immediately draw on it. There's a facility to email the bank, too. Whether the bank will then charge you for responding, as often happens with High Street banks, isn't discussed.

CompuServe is currently looking to extend the service by going into alliance with other High Street banks. So, in the near future we're likely to see several of these ventures. Barclays, for one, has just begun trials of its own home banking service in collaboration with Visa International. Last March it randomly selected 2,500 of its UK customers to test the system. If this and others succeed, within ten years, banks as we know and love (?) them could well disappear from town centres, and instead simply become sites on the Net.

Ten to one

Barry de la Rosa selects ten top web utilities. A splendid time is guaranteed for all.



1 EZ Download

Download from: http://www.sirius.com/~darwin/apps/EZdl.zip

This small plug-in for Netscape is for those who want to download, extract and set up files from the Web without having to juggle windows. It works by assigning itself as the default viewer for .zip and .exe files in Netscape. When you click on a link to download a file, it saves the file to a temporary directory in the background and then runs the setup utility, leaving you to continue browsing. If there is a file you just want to save to disk, you can always right-click the link and choose the "Save link as" option. A must for those with fast enough connections who want the latest shareware.

2 Milk Truck Delivery

Download from: http://www.milktruck.com/beta/win32/mtd10b2.exe

This clever off-line reader uses the 32-bit capabilities of Netscape to their full potential.

If you're in the habit of scanning newsgroups or email for URLs, then this is for you

The program sets up a proxy server on your PC and uses a series of web pages loaded in Netscape to help you organise which sites or pages you would like regularly delivered. You can use it off-line to view previously delivered sites, or online it will add a menu to each page to allow instant subscription to sites. You can even record a series of pages to subscribe to. Fully configurable and fast, it is a must for slow connections.

3 Net Bar

Download from: http://www.intercom.no/~thomas/nb.zip

Net Bar is a small application launcher that sits above open windows on the desktop. It jumps ahead of the pack by additionally allowing the automation of Win95 Dial-Up Networking, including automatic re-connection.

Up to 20 applications can be dragged-and-dropped onto the bar. As well as this, it offers a display of time or cost, which is fully configurable. Up to six mail servers can be checked on a regular basis and your mail program launched. Net Bar is a vital utility for those who use the Net regularly, with multiple clients.

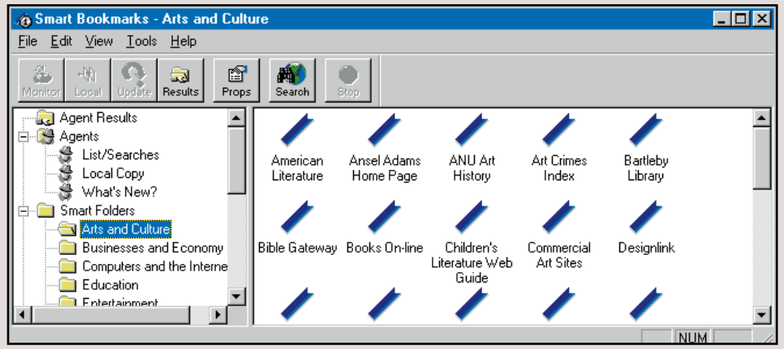
4 URL2Net32

Download from: http://www.compulink.co.uk/~starcourt/u2n4032f.exe

A handy tool for capturing web addresses from the clipboard. If an area of text is copied along with a URL, URL2Net will parse this information and add it as the description of the link (i.e. the highlighted text in your browser). It can store the link in

5 Smart Bookmarks

Download from: http://www.first-floor.com



Get those bookmarks organised and up to date with this essential bit of kit

An essential add-on to Netscape, Smart Bookmarks not only organises all your bookmarks, but allows you to keep them up to date on a regular basis, and keep local copies of your favourite pages. It adds new menu items to the Netscape Bookmarks menu, allowing you to view your bookmark folders in frames (Netscape 2 only) and file bookmarks in specific folders. A built-in web search facility gives access to the best search engines without having to download the query page. Although the Update function can be a bit unstable, it is nevertheless an essential package for all its add-ons.

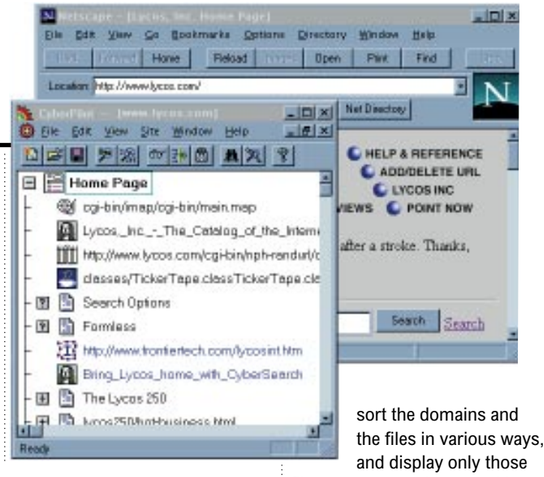
the bookmark file, hotlist or favourites folder of your choice, allowing you to choose the sub-directory. It even hides itself after you've used it! If you're in the habit of scanning newsgroups or email for URLs, this is for you.

6 Cyber Pilot Pro

Download from: ftp://ftp.netcarta.com/pub/Cppb2.exe

NetCarta's idea is simple: its utility allows you to map out a web site without having to trawl through every page, saving you time while reducing the load on the network. Sites that support

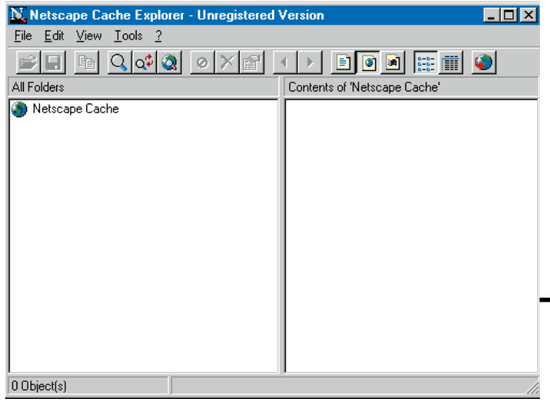
Cyber Pilot Pro — a Web mapping wonder



NetCarta's plan will automatically download a full web map, although what their sponsors think of this is another matter. The program can be used side-by-side with your browser, making the search for that essential information even easier. Web maps can be saved and exported, and a number of sample maps are available at the NetCarta site, catering for a variety of tastes.

7 Netscape Cache Explorer

Download from: http://ourworld.compuserve.com/homepages/M_Wolf/nsce@.exe



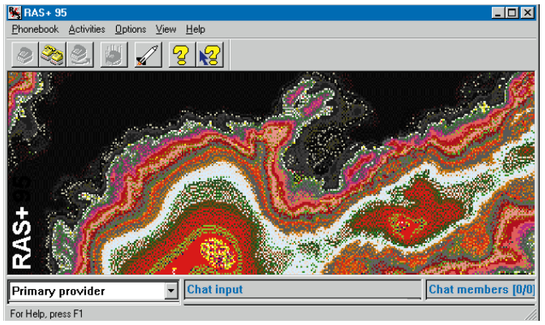
Cache in on this top utility. Files are presented in a clear, Explorer interface

The cream of the cache tools, this utility allows you to view every detail about the files Netscape stores in the cache in a clear Explorer interface. You can sort the domains and the files in various ways, and display only those file types you are interested in. Pages can be viewed in Netscape with all local links active, so you can revisit each page you originally visited. You can also store important pages on disk, and NSCE can automatically save the images and links associated with a page. Also a good tool for deleting pages from the cache that you will never revisit.

8 WebSeeker

Download from: http://www.ffg.com

The best desktop web search facility there is. WebSeeker passes keywords to a number of



Automatically DUN — this is an essential tool for Win95 dial-up networking users

Search Engines, collects, collates and presents the results to you, removing duplicates. It can then create a web page much like a bookmark file to allow you to visit each site in the list. You can then delete or monitor entries, so that next time you run the search, only new or updated results are shown.

Additional search parameters can be added to a category, allowing complete flexibility when researching a broad subject. A great utility for creating comprehensive bookmarks and keeping up to date in your chosen field.

9 Net Connector

Download from: http://www.winsite.com/pc/win95/netutil/netcon.zip

This is an automation utility that allows you to assign a shortcut to any individual Winsock client. When activated, it will open your connection automatically, and open the client. When you quit the client, it closes the connection. Simple, but useful when you just want to collect mail or see the latest newsgroups. It can be optionally configured to wait after closing one client, to see if you open another. Easy to set up, it is another good utility for getting around Windows 95's annoying prompts and delays.

10 Ras+ 95

Download from: http://www.lambsoftware.com

This is an essential tool for those who want to automate the Windows 95 Dial-Up Networking procedure. It allows you to configure almost every aspect of dial-up: minimum connect speed, multiple service providers with automatic cycling on dial-up, and delays and time-outs. A launch pad allows you to configure apps to run on connection. Setup is simple and the user interface is gorgeous. There is always more than meets the eye; it even includes a Ping client. Although still under development, this is a powerful addition to Windows 95's Dial-Up Networking.

PCW Contacts

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net.newbies

Getting started on the Net: what to do, where to go

These pages are designed to be an easy-to-use reference guide to the Internet for the novice.

So what is the Internet?

The Internet consists of millions of computers interconnected in a global network. The number of users is difficult to measure, but those worldwide who can at least exchange electronic mail messages is estimated to be 30 million and growing.

What about this World Wide Web then?

It is *not* the Internet. It is a service on the Internet which uses special software known as Web Browsers (usually available free) to give users access to pages of information with pictures and multimedia instead of just text. About 15 million people around the world have access to the World Wide Web.

Sounds great. What do I need to get on?

A PC of almost any age can be connected to the Internet as long as you can plug it into a modem. You don't even need to be able to view graphics on your machine to look around (although it helps).

A modem allows your PC to dial in to another computer with a modem and communicate with it. They come in different speeds, from 2,400Kbps to more than ten times that. When you are using the Internet, the speed at which things work is more likely to be limited by the speed of your modem than by that of your computer. Buy the fastest you can afford. An old 2,400Kbps model is fast enough to exchange electronic mail messages, but to send and receive files, or use the more exciting services on the Internet, a modem which runs at a speed of at least 14,400Kbps is vital. Fortunately, these have plummeted in price over the past few years and now cost as little as £100. If you have the money, go for a 28,800Kbps V.34 modem. Over time, you'll recoup the added cost by reducing your phone bills.

Okay, I've got a modem. Now what?

For a modem to bring you information, it has to have a number to dial. This is where a "service provider" comes in — you have to subscribe to one if you want to get online.

Whatever kind of connection you have set up, you will have to pay your phone costs on top of any subscription, unless you are lucky enough to get free local calls through a cable company.

The bigger service providers will have the numbers you dial, PoPs (points of presence), scattered across the country so you only have to dial a local number.

If there's no company near to your home which offers Internet access, you may have to pay long-distance phone rates. Once connected, though, it doesn't matter where the information you are accessing is physically located: you are always charged at the same rate. A list of providers and telephone numbers is available in the panel below. For more details, have a look at the supplement which was banded with the January issue of PCW.

Full Internet access, which allows you to use email and Internet services for any amount of time, limited only by the size of your potential phone bill, costs more, currently between £8.50 and £15 per month. There are dozens of companies offering this kind of Internet access, none of them big enough to dominate the market. The basic service being offered is largely the same, although some higher-priced providers may claim to offer a more personal service or a better selection of access software.

Why don't I just join CompuServe?

Or you could try AOL, Europe Online, UK Online and MSN who all now offer Internet access and also have a large number of services of their own to which only their subscribers have access. These services include official technical support for hardware and software by electronic mail, online games, vast indexed software libraries and databases of business or consumer information. A monthly subscription tends to cost between £5 and £10 per month, plus a charge per hour if you are online for more than a set number of hours in that month. But as the market becomes more competitive, prices continue to fall.

Demon Internet is the best known and most popular of the standard Internet operators and is certainly more newbie-friendly than it used to be. Perhaps better for the raw newbie is Easynet or UK Online. The latter is a special case; a cross between an Internet provider and an online service. For £8.50 to £12.75 per month it offers unlimited access to the Internet, partially "censored" to make it safer for children to browse, plus access to online magazines and other services.

Any good service provider should provide you with appropriate access software when you sign up, and if you want to choose something different, most of it can be acquired online, free of charge.

PCW Contacts

AOL 0171 385 9404
CompuServe 0800 289378
email:70006.101@csi.compuserve.com
Delphi 0171 757 7080
email: uk@delphi.com
Demon 0181 371 1000
email: internet@demon.net
email: sales@demon.net
Easynet 0171 209 0990
Europe Online 0171 447 3400
Global Internet 0181 957 1003
email: info@globalnet.co.uk
UK Online 01749 333333
email: sales@ukonline.co.uk

● If you don't understand what's written here or have any suggestions, please let us know. Contact **Paul_Fisher@pcw.ccmail.compuserve.com**, or "snailmail" (Internet-speak for the post) to the *PCW* Editorial address on page 12.

net.news

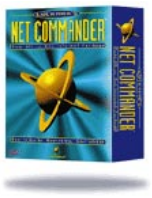
Internet World 96

A company previously unknown in the UK has made a splash at the Internet World 96 show at Olympia, London. Los Angeles-based Luckman Interactive launched a flurry of Internet applications and utilities at the show, which threatened to outshine even the bright blue attire modelled by Luckman personnel on the stand.

Flamboyant CEO, Brent Luckman (*pictured here*), introduced Web Commander as an NT or Windows 95 all-in-one server package, claiming it was easy to set up and offered more features than rival packages. It supports the S-HTTP (Secure Hypertext Transport Protocol) for online transactions and has an Excite Search engine built-in. Credit card transactions can also be configured out of the box.

The server log lists not just who is visiting the site but which parts of the site are visited most often. A referrals list details where visitors are accessing the site from. Databases can be accessed from built-in ODBC support and wizards aim to make this a step-by-step operation. The NT version can support multi-domains on one PC and costs around £169, while the Windows 95 version costs about £90.

Luckman's ISP Connect is an integrated utility suite aimed at start-up ISP businesses. It includes automated billing and password procedures so that ISPs don't have to program these themselves. Running on Microsoft's NT Server, ISP Connect automatically configures email addresses, password and log-ons for the new customers. It can be configured for delivery on CD-ROM or a set of floppy disks with ISP logos and documentation. A built-in browser automatically defaults to the ISP's home page. Businesses can also specify the level of software bundled as part of their disk sets to include newsgroup readers or email software.



For end users, Net Commander is a full Internet suite designed to compete head on with QuarterDeck InternetSuite and Delrina CommSuite. Luckman's product includes 25 Internet applications, including Eudora, Real Audio and other HTML plug-ins. The CD then places all these files in the correct directories on the PC to make using the Net easier for new users. Net Commander will cost around £50.

Luckman also announced a Best Of The Web CD-ROM which lists 100,000 sites edited by seasoned Web experts. The CD can launch a Web browser to take users directly to any of the listed sites and gives an estimate of average download times. It will cost around £40.

Brent Luckman also revealed that his company will release a utility called Rush which will "significantly improve access times". It won't have any effect on hardware but will improve software and browser performance on client PCs.

Also in the pipeline is Multimedia Mail which will "update email by about 20 years". The idea is to make email as seamless as real mail and hide all the IP clutter from messages. In effect, users will be able to send email as easily as writing a letter. Both products are expected to arrive in the third quarter of 1996.

● **Luckman Interactive http://www.luckman.com**

Hot off the press

SoftQuad, the Canadian developer of HTML and SGML packages, used Internet World 96 to spruce up its high-end HoTMetal Pro HTML Editor. Building on version 2.0 HoTMetal 3.0 will support Java and HTML 3.0 standards, as well as Netscape extensions supporting frames and MacroMedia Shockwave files. Microsoft's new ActiveX technology will also be supported.

Improved drag-and-drop capabilities will enable users to drop images from existing documents into HoTMetal and convert them instantly to embedded graphics. Up to four proprietory browsers can be added to the toolbar menu for page preview.

Instant image maps can be created by right-clicking on GIF or JPEG images. HoTMetal Pro also functions like a standard word processor, with spell checker, thesaurus and dictionary.

SoftQuad claims that users never need to worry about HTML, as the software checks HTML and corrects errors on the fly.

The company also made public details of its alliance with Novell to bundle HotMetal Light, a cut-down version of HotMetalPro, with Novell's new intranet server, InnerWeb Publisher. A multi-user license will allow up to five people to use HotMetal simultaneously from the server to create intranet pages.

HotMetal Light will also be bundled as part of Turnpike, Demon Internet's recently-acquired Internet access suite. Demon customers will be able to use HoTMetal to build web sites which can be uploaded and maintained from Demon's servers. Members will be given the option to upgrade to HotMetal Pro via Demon's Product and Services Division.

The WYSIWYG HTML editor market is becoming more competitive with new versions of InContext's Spider and Microsoft's Front Page, now updated from the version acquired from Verity (see our review in *First Impressions*).

● **SoftQuad 0181 236 1001; Www.sq.com**

Email bonding

A service called Big Foot is attempting to emulate Yahoo's enviable example of turning a simple web site into a world-beating and profitable business.

Based on the premise that the number one activity on the Internet is email (over 50 percent), Big Foot is a database of more than four million email addresses from all over the world. They are taken from the public domain or, increasingly, from users willing to submit their email address for inclusion. Jim Hoffman, co-founder of the service, has a background in complex database technology including work for CompuServe and Lexis/Nexis.

Apart from its business applications, many people are using the site to try and trace former colleagues or long lost college friends, said Hoffman. Listings can include home telephone numbers and addresses. Bigfoot claims the database of names is growing at a rate of over a million entries per month.

Using Big Foot is simple: to find an email address users just enter the first and last name and then hit the search button.

According to Hoffman, the site will generate revenue from online advertising, although currently it boasts only one ad.

Later, Bigfoot plans to launch a mobile email service. Many people have more than one email address on different online services and ISPs. With a one-shot email address, all accounts can be covered and sent simultaneously via Big Foot technology.

● **www.bigfoot.com**

Another Planet

Planet Online has announced that its 0800 freephone access is now available throughout the UK. While the service by-passes BT's call charges, Planet bills users for time spent online. Many rival services use normal BT access but do not charge for online time.

Until the end of December, Planet is offering consumers free subscriptions for a one-off connection charge of £9.99. A monthly subscription charge of £7.99 comes into effect in January '97. Weekday online charges are £2.50, falling to £1.50 at weekends.

A special business package offers a one-time connection charge of £39.99 with no further monthly subscription charges and an hourly rate of £3. All Planet Internet packages charge users by the minute. A copy of Netscape Navigator 2.0 is shipped to all subscribers and future upgrades are provided free of charge.

● **Planet Internet 0500 345 400; www.planet.com**

Net.surf

Tuning in to NME

NME, my favourite UK music paper, has made it onto the Web. Launched in June, the site features editorial from the pages of NME as well as exclusive web content, including the chance to put your own view across to the paper. Judging by the paper's history, NME readers won't be backward in coming forward.

The You Too section promises on-line interviews, while EarWhacks will have sample tracks of all singles and albums reviewed in each week's magazine.

An Interactive gig guide will allow users to search for personalised UK gig information based on bands, dates, venues and locations.

● Http://www.nme.com

It's the business

At the other end of the publishing spectrum is the *Wall Street Journal Europe* which has one of the finest newspaper sites yet seen. It goes for clarity rather than flashy web tricks and is all the better for it. It was free when launched but soon access will be restricted to those who pay $49 a year for the privilege. For those who need up-to the-minute business news, personalised stock quotes and company news, this is an essential web destination, and something of a bargain.

● Http://wsj.com

THE WALL STREET JOURNAL INTERACTIVE EDITION.

'Ere we went

Although the championship is now over, the Euro 96 Web site is still up. Here you can relive England's Euro football adventure along with all the goals, incidents and heartaches.

The site was developed jointly by Digital, Microsoft and the Sema group and is a great advertisement for Internet Explorer 3.0. Check out the rotating advertising boards.

● **Www.euro96.com**

European exploration

Other sites worth a look are EBN and Muscat Euroferret. EBN is at www.ebn.co.uk. It's an extension of the business TV channel with a real-time financial ticker and rolling news headlines.

Muscat EuroFerret is a new search site which aims to give a European perspective on web searches so instead of a list of US teams coming up when looking for "football", you get some real ones. But mainly, Muscat aims to help UK businesses find the information they want on Europe, in native languages. The search engine can recognise any roman alphabetical language. Ferret it out at www.muscat.com.

EBN muscat News

BT Charges Beta Testers

Undeterred by criticism of its ISDN pricing policy, BT is charging beta testers £6 an hour (peak rate) to test its new online games network Wireplay, writes Brian Walker. Many testers were unaware that they were going to be charged for providing feedback to BT and no mention is made of it in the starting pack, nor on the BT Web site that advertised for testers.

PC Gamer magazine recently ran a special offer inviting readers to trial the new service though editor, Jonathan Davies, was unaware that they would be charged. "It was never mentioned in discussions. I was under the impression it would be free," he said.

Colin Duffy, head of games development at Wireplay, said that what is being offered now is a "market trial", not beta testing. "We are offering people a chance to be the first to see and use a new technology. This is a fully developed product, not one that is falling over all the time."

Wireplay
The games network from BT

However, many of the features in Wireplay are not yet fully functional so why charge for a service that is incomplete? "The people who are using it are not testing but playing. We want to find out how much people are prepared to spend," said Duffy.

● There is some good news for BT subscribers. Until 31st August, you can join BT Internet without paying the normal £20 connection fee. BT's Internet service is now available via 64Kb/sec ISDN lines — for an extra £20 per month.

● AT last, Mac users can expect a version of BT Internet especially for them by, er... well, BT will "make an announcement when it is ready".

● One of *PCW*'s alert readers tipped us off to this money-saving trick: forget granny and make your ISP dial-up one of your five most called numbers and save ten percent each time you dial!

www.bt.co.uk

Adobe less dopey

To some it seems that Adobe, a sleeping giant grown fat on the spoils of the DTP revolution of the eighties, has been caught napping by the Internet. But building on its OpenType announcements with Microsoft (see *Hands On, Graphics & DTP* p298), Adobe has woken up feeling hungry and PostScript is at the heart of its new strategy.

Adobe is targeting what has always been a successful market for the company: content developers. "Our goal is to provide developers and content creators with an integrated suite of products and technologies that will enable them to take the Internet to the next level of the Web and beyond," said Charles Geschke, president of Adobe.

Vertigo is an authoring technology, still in development, that will combine editing and player tools for Web and CD-ROM development. It is based on Bravo, Adobe's new API (Application Programming Interface) for displaying, printing and managing internet graphics and text. Bravo is PostScript-based and Adobe hopes to create a new standard on the Internet for information transfer, much as it did with PostScript in desktop publishing. Bravo has been adopted by JavaSoft and will be integrated into a future version of the Java platform.

PrintMill will allow intranet users to print PostScript documents to any printer on the network from a standard web browser. Later, Printmill will be available to the wider Internet so that PostScript documents can be printed via the Web to a PS printer anywhere in the world. Adobe sees this is as a cost-effective alternative to faxing that would also allow transfer of content-rich documents.

Web Presenter is a derivative of Adobe Persuasion, designed to use the Web for multimedia presentations linking URL's, graphics and PDF files over the Internet. A beta Web Presenter is available on the Adobe web site. Adobe also stated that Microsoft's ActiveX technology will be supported in a forthcoming Windows version of PageMill, its HTML editing package

● **www.adobe.com**

Read all about it

Joining IBM and Microsoft, Apple is to license Java and make it an integral part of its forthcoming OS upgrade, codenamed Copland. Apple says it will incorporate Java into media authoring technologies, servers and CyberDog, the OpenDoc-based Internet access software.

"This is an important step in Apple's plan to launch cutting edge Internet products and services," said an Apple spokesman.

● **www.apple.com**

Apple gets the Java habit

VNU Business Publications, the publisher of *PCW* has launched a web-only Internet magazine. *Internet Business* targets the business community and network professionals with news and reviews of key Internet products and developments and will be updated daily. The editorial team are writing copy directly for the Web, cutting out the delays normally associated with print magazines. VNU hopes to attract up to 40,000 subscribers. *Internet Business* is accessible on www.vnu.co.uk/ib.

Five go mad on NCs

San Francisco's Westin St Francis Hotel saw five of the biggest names in computing cement a proposed open standard for the much touted Network Computer systems (NCs). Apple, IBM, Netscape, Oracle and Sun Microsystems all lined up to endorse the new NC Reference Profile.

The Profile combines existing PC standards with new ones to create a range of new network devices. These will include not only NCs but PDAs and consumer devices as well, such as TV and telephone. The five companies hope to make the Internet as ubiquitous as telephone and TV services.

The profile is said to set standards without imposing hardware limitations. Closer examination shows only a small shift from existing PC standards, reflecting the difficulty of creating new markets without upsetting corporate investment in existing hardware.

For instance, the hardware standards propose a minimum screen resolution of 640 x 480 VGA, a pointing device and text input capabilities. Sounds like a PC? Standard Internet protocols will not move from TCP/IP, FTP, SMTP and HTML. One key difference is the lack of any locked-in processor/OS architecture like DOS/Intel or MacOS/Motorola.

Manufacturers seeking to build NCs will be encouraged to promote their devices as NC Profile compliant and display a new NC logo in marketing and sales literature.

Network computers have divided the computer world. Some analysts are predicting the collapse of the PC and with it the Wintel cartel, while others see a return to the days of mainframes with network companies such as Oracle or Sun set to benefit.

Microsoft, which publicly downplays the concept of Network Computers, is reported to be developing a version of Windows designed to run on NCs. So far, over 70 companies have endorsed the new Profile including BT, Wyse Technology and Adobe. Microsoft and Intel have not.

A draft of the NC Reference Profile is available at http://www.nc.ihost.com.

net.answers

Lost on the Internet? Nigel Whitfield shows you the way to go.

Exchanging email

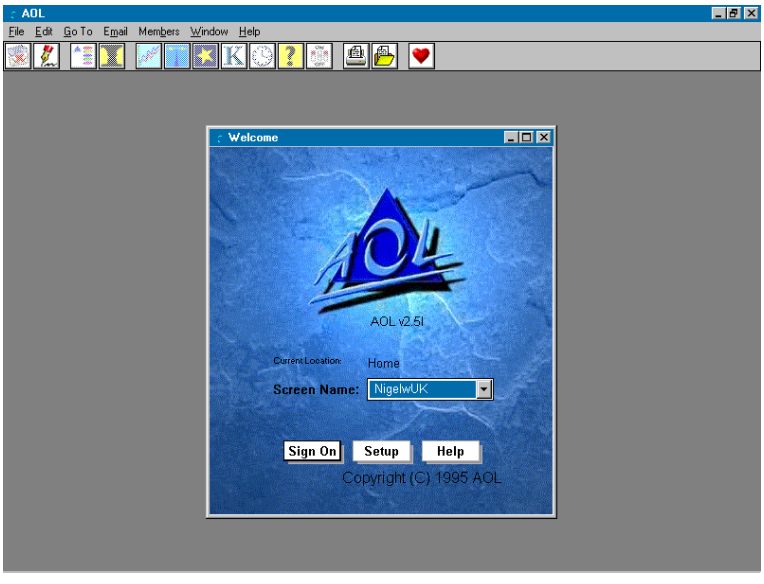
Q. I was very interested to read your article about using MS Exchange for email. Can I use this program in conjunction with AOL? I have spoken to a telephone support person who told me that this isn't possible, but I do remember, not too long ago, when I used MS Exchange with my CompuServe account (which isn't PPP either).

A. The AOL support team are right — for the moment.

Microsoft Exchange has "services" that can be added to the program to allow you to send mail to different systems. One of the services is the Internet Mail extension, for which you'll need a TCP/IP connection, via a network or via PPP, to an Internet mailbox. If you've also installed MSN on your computer, you'll see it listed as a service in Exchange (select the Tools menu, and then choose Services to see what is installed).

There is a "service" for Exchange that works with CompuServe, so you can use it for mail instead of programs like WinCIM (if you don't have it already, it can be downloaded from http://www.microsoft.com/windows/software/drivers/other.htm). This provides the glue that links everything together. Since there's no such service available for AOL, it's not possible to use Exchange. That may change in the future though, as part of the deal between Microsoft and AOL to include the latter's software in future versions of Windows.

For now, if your main concern is to minimise the time you spend on AOL handling email, you should use Flash Sessions, which allows you to automate everything, with AOL fetching all your new messages and then hanging up the phone. Remember, though, that if you use a flash session for all your screen names in one go, AOL will dial up once for each name. Here, it's probably more efficient to connect to AOL over the Internet, if you have that option.



You can't use Exchange to access AOL yet, though there is a service available for CompuServe

Making the connection

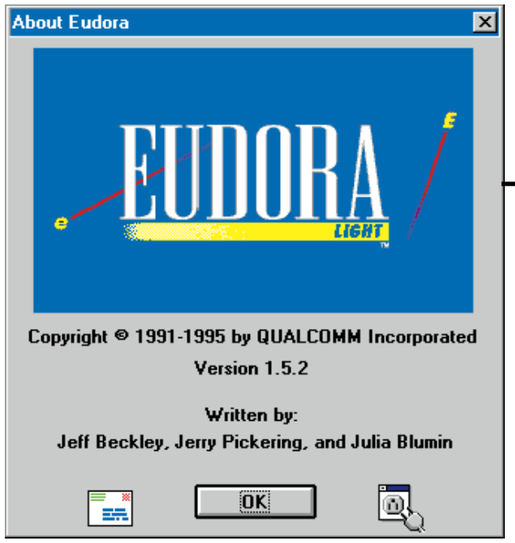
Q. I hope you can help: we are currently setting up an Internet connection and plan to use an SCO Unix-based Web server running Open Server. We will be using a modest Linux machine as a mail server for internal and external use.

I have been able to get Microsoft Exchange to connect to the Linux box but am unable to find a Win3.1 mail client that will communicate via TCP/IP (Winsock), which doesn't require a dial-up account. Can you suggest any packages (shareware or PD if possible)?

A. There is a large number of mail packages that can be used for this job. One of the most popular is Eudora Light which can be downloaded from many Internet providers, including Direct Connection, at http://www.dircon.co.uk/.

Although it's more often used with a dial-up connection to the Internet, Eudora will work perfectly well over the network — in fact, it's one of the programs that I use for mail on my own network. The free version of Eudora provides enough facilities for many people but it won't automatically filter mail into different mailboxes; if you want to do that, you might be better off looking at Pegasus.

For a commercial solution, ZMail may be worth considering as it is very powerful and has a built-in scripting language. Another alternative, which would



Eudora is a good choice for a free email program, and will run on both Windows and Macintosh

solve two problems at once, at the expense of speed, is to use Netscape Navigator 2, which includes a mail reader, although you will need a reasonably fast machine and a lot of patience to put up with the lack of speed.

It's also worth remembering that if you have an up-to-date edition of SCO Open Server (Release 5), it will have a POP mail server configured when you install it, so you may not need to use the Linux system for mail at all. However, it may be a more sensible solution if you want to split the load between different computers. For older versions of SCO operating systems, a POP server can be downloaded from ftp.sco.com: it's in the file tls049.tar.Z.

Domain name registration

Q. I am interested in starting my own Internet Service Provider business some time in the next few months. I would like to know where and how in Africa I register the domain name? The operation is to cover East Africa, including Kenya and Tanzania.

Secondly, what hardware and software would you recommend me to use for a complete but low-cost Internet Service Provider solution?

A. How you go about registering a domain name differs from country to country. If you want to register a name within your own country, the best solution is to ask for advice from established Internet Providers, or check the InterNIC database for up to date contacts, via http://www.internic.net/ or using tools such as "Dig". As we went to press, the contact for Kenya was hostmaster@ns.psg.com.

However, since you're planning on covering more than one country, you may be better off registering in the .COM or .NET domains, which are international. For these, you will need to register directly with InterNIC.

The question of hardware and software is a little more thorny: it really does depend on what sort of service you anticipate offering and how many users you expect to have. It's possible to spend many thousands of pounds on specialised equipment like the Ascend Max, which will answer calls and connect them to a TCP/IP based network, with Unix servers to handle mail and news.

At the other end of the spectrum, dial-up Internet access in the UK started with Demon Internet, which originally used a single 486/25, with 300Mb of hard disk space and eight modems, running SCO Unix and Morningstar PPP. Times have moved on, however, and it would be best to have different computers for each of the services that you offer to your customers — mail, news and so forth — to prevent overloading. Don't forget that you'll need permission to resell connectivity from whoever provides your own link and that may not always be easy to come by in certain countries.

Different addresses

Q. What is the difference between a static and a dynamic Internet address? Is there a good reason to choose one over the other?

A. This, along with the debate between the SMTP and POP mail systems, is one of those questions that comes around time and time again in some of the Usenet newsgroups. However, let's get the technical information out of the way first.

Double talk

Q. Do you need Telnet to chat with someone over the Internet, or can it be done using another application? I want to chat one-to-one as well as in groups.

Q. I am a newbie and use Internet Explorer and MS Exchange. I was wondering how to get online chat facilities?

A. I can answer both questions in one go. There is a huge number of different ways in which you can chat with people on the Internet. The most popular method is by using Internet Relay Chat (IRC), which is a little like the CB simulator on CompuServe. IRC is divided into lots of different channels, for discussions on any subject under the sun. You can create a channel whenever you like and invite other people to join in, or leave it public if you're not worried about privacy. Messages that you type on your computer will appear on the screen of everyone else who is using the same channel.

It's also possible to send messages directly to other people, using IRC. To use it, you either need an IRC client program which runs on your computer alongside things like Exchange and Explorer, or you can use Telnet (which is included in the Windows 95 Internet software) and connect to a public IRC system such as the one at irc.demon.co.uk. Using these is a good way to find out whether IRC offers what you want before spending the time downloading a special piece of software.

Another way of chatting is to use a talk program, such as ntalk, which connects directly to another user on their computer so you can type messages to each other directly without others being able to see what you're saying. Although this is more private, it's also rather limiting. Unlike IRC, you can't send someone a file (say, a picture of yourself) while you're chatting, and since you have to know the address of the recipient's computer, it won't be very easy to use these programs unless your Internet Provider gives you a "static" Internet address (see "Different addresses").

Finally, you can use "talkers" to exchange messages with other people. These are computers on the Internet designed specifically to host conversations between different people; you connect to them using Telnet. Since all those taking part in the conversation are connected to the same system, you won't experience the delays and other problems often found with IRC.

With a dynamic address, your computer will be allocated an Internet address each time it connects to your provider. With such an address, you can configure your software with a unique address and you will always have that address, each time you connect to the Internet. You'll also often have a host-name which links the number to a name that's easier to remember.

Although it is possible to link a name to a dynamically-assigned address, for technical reasons it's not usually done. If you do see a name displayed when you access certain services from a provider that uses dynamically-assigned addresses, it will usually be a name assigned to the telephone line that you happened to dial in on.

So, what's the big difference? For most purposes, none at all. You can transfer files, surf the Web or log on to other systems without any problems, regardless of whether or not you have a static address.

However, one way in which to increase security on the Internet is to refuse connections unless they come from specified hosts. The only way to specify the host is by referring to it by number (the names are just a convenience for humans). What this means is that if your computer always has the same static address, it's easy to add it to a list of systems that's allowed to access a particular Web server, for instance. But if you have a dynamic address, that's impossible; an address that you use one day could be associated with someone else's computer the next.

You will also have problems if you want to make information on your computer available to other people via a Web or ftp server, since they won't know an address to connect to (unless you tell them when you're already connected). You won't be able to use one-to-one talk programs either.

There is a solution to at least some of this, however. If you want to use a talk program when you're connected via a dynamic address, you can arrange to meet someone on an IRC channel. Most IRC programs will tell you the address of each person connected, so you'll be able to find out both your address and that of anyone you want to talk with directly, and then use the information in other programs. Depending on the TCP/IP software you use, you might also be able to find out by looking at the options that it reports when you connect.

In summary, while there are some advantages to having a static address, it's probably not worth worrying about.

System protection

Q. We have networked our PCs at the office with slow Ethernet technology. We will shortly be getting Internet connectivity and a connection to the outside world. I would like to know whether there are any firewalls which would run on the Windows 95 platform. Until now, I have only come across firewalls operating in Unix and Solaris environments.

A. I'm not aware of any firewall software that runs on Windows 95 — and anyway, it wouldn't be the best solution. The best way to protect your systems is at the point where the Internet comes into your office, which will usually be via a router.

That way, even if someone runs an unauthorised program on one of the computers, your security won't be compromised since outside access will be prevented before it reaches the Ethernet.

One of the biggest security worries is file and printer sharing in Windows 95. You should make sure that this is not using the TCP/IP protocol on any computers connected to the Internet, because the security features in Windows 95 are not very robust and other people could gain access to your computer systems.

It's also worth setting up your router to prevent access from the outside world to ports 137, 138 and 139, which are all used by Windows 95 networking when it's run on a TCP/IP network. By filtering out requests for connections to these ports, you will prevent anyone being able to access the Windows network even if the settings on some of the PCs would otherwise allow them to.

You should also ensure that no programs providing servers, such as Web servers or ftp servers, are running on any PCs which have sensitive data on them, as this can cause potential security problems. In fact, unless you have very good reason to do otherwise, it's a sensible precaution to prevent connections from the outside world for anything much more than email and finder services.

Net access for Win95 upgraders

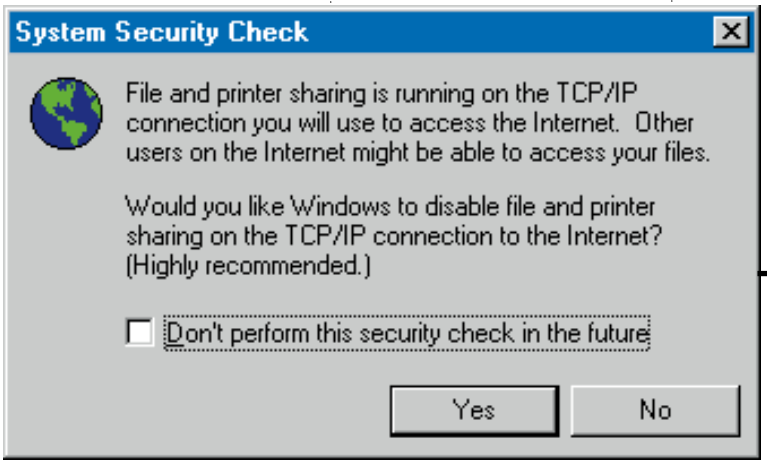
Q. Having upgraded to Windows 95, I don't have Internet email access included with my copy of Exchange. My friend bought a new PC with Windows 95 and his system includes all the Internet software. Have I been short-changed for being loyal and upgrading?

A. If you'd asked me this question a couple of months ago, the answer would probably have been "yes". But Microsoft has made the Internet service for Exchange available on its Web server so you can download it free of charge, along with Explorer, which gives you all the Internet software included in the new version of Windows 95.

However, unless you want to use Exchange for other things, like fax and Microsoft Mail, you'd probably be better off using the Microsoft Internet Mail program which is much faster and less confusing to use. It's part of Internet Mail and Newsreader, and beta versions can be downloaded now; in fact, the installation routine recommends that you use the new program instead of Exchange. This is good advice, as it will be far quicker and simpler for most people.

You can find out about both, from Microsoft's Web site:

- For the Exchange add-on, look at www.microsoft.com/software/inetmail.htm
- For the new mail reader, go to www.microsoft.com/ie/platform/imn.htm



Don't run file and print sharing from Windows 95 over TCP/IP networks, unless you have a firewall

PCW Contacts

Nigel Whitfield is a freelance writer and maintainer of several Internet mailing lists. He welcomes comments via the address **nigel@stonewall.demon.co.uk**; if you have questions you'd like answered, please send them to **net.answers@stonewall.demon.co.uk**.
Please note that a personal response to every query cannot be guaranteed.

Innovations

Hearing aid

Sound spatialisation techniques, originally developed for the home cinema market, are enjoying a surprise revival in the multimedia boom.

OVER TWO YEARS AGO I covered the introduction of SRS, a system that produces surround sound from just two front speakers. The system works by duplicating the clues your ear uses to localise sound. These clues are naturally created by a combination of different arrival times of a sound source at each ear, and the tonal filtering that happens as the sound bounces its way into the ear from different directions.

If these effects are electronically applied to a sound coming from a pair of front speakers it is possible for the ear to be fooled, to some degree, into interpreting the sound as coming from the sides or the back. When carefully set up, these "spatialisation" techniques — created not just by SRS but also by Roland's RSS system and QSound — can be remarkably effective, generating a fairly convincing virtual surround. Although there was some noticeable interest in using these systems for PC games, the main thrust of spatialisation was for music and the home cinema market, where it never really took off.

Virtual surround

But currently, interest is really growing in the multimedia PC (MPC) world where virtual surround has many advantages and is a natural match with the MPC set-up. The sound system on most PCs is stereo, which is a good start as virtual surround needs two channels of sound from which to work and the speakers are more often than not properly placed: evenly, to the left and right of the listener.

When you are sitting at your MPC, you are also close to the speakers. Room reflections play little part in what you hear so the speakers work almost like headphones, making it a lot easier to control the virtual surround effect.

Consequently, there is a nice little battle developing between the different virtual surround systems for the hearts and ears of the MPC generation.

The key players are still the likes of SRS and QSound, with Dolby the new arrival (to the PC business, anyway) coming up rapidly from behind.

Each of these systems is applied to multimedia in significantly different ways. QSound is primarily encoded into the soundtrack of game or M/M software, either by pre-processing the stereo audio with QSound algorithms, or using a real-time implementation that runs the QSound algorithms on the processor (the CPU or DSP chip). Either way, QSound is perceived more as a system placed within the multimedia software itself. From the user's point of view it has the advantage that you buy a QSound game and you don't need any additional hardware to make it work, apart from a pair of speakers.

But alternative systems, such as SRS, use processing placed in the playback hardware, usually in a dedicated DSP chip built-in to the soundcard or external active speakers, to create the virtual surround from any sound source. The advantage with this approach is that it works on any stereo game, multimedia software, or any stereo source fed into the PC. But the downside is that you are not re-creating a planned surround effect. Instead, you are getting a warm surround glow to every noise your PC makes.

DVD discs

Dolby has come in late in the day but is working on several alternative strategies to try and capitalise on the up-and-coming DVD (Digital Versatile Disc) market. DVDs of major movies will all contain Dolby Pro-Logic soundtracks, and in the US, the AC-3 digital multitrack soundtrack as well. Since these discs will be playable on DVD-ROM drives within PCs, Dolby plans to make the most of the opportunity to become established in the PC market. Dolby is already working with Microsoft on deeper integration of surround sound into Windows, but it also has two other approaches that will have a more immediate impact. The first is the development, with US speaker specialists Altec, of a surround speaker system which includes its own amplifiers and Pro-logic decoder. The decoder separates the front and surround information: the front channel signals are fed to the speakers in the lower half of the system; and the surround signals are fed to the upper speakers which fire sideways to give a more enveloping sound.

Next stage

But the next stage for Dolby is to go down the spatialisation route, and it has several major chip developers working on Dolby-based spatialisers. Like the other hardware spatialisers, these will process the audio after it has been drawn from the DVD or CD-ROM.

The two-channel audio, which contains the rear information, is first decoded by a standard Pro-Logic chip. This passes the front left and right signals through the system and on to the speakers, more or less unaffected. But the pure rear channel from the decoder is fed into the spatialisation DSP so that it can be programmed to sound as if it were coming from the rear. The added advantage for Dolby is that, with movies, most of the surround is atmospherics which are more convincing on spatialiser systems than pin-point travel-round-the-head effects.

The end result is movies and music videos (and more Dolby-encoded games) playing happily on your desktop home cinema PC and giving you a bit of that cinema-sound experience — but with no trailing loudspeaker wires for you to trip over.

Tim Frost

CUTTING EDGE

Horizons

Reverting to tape

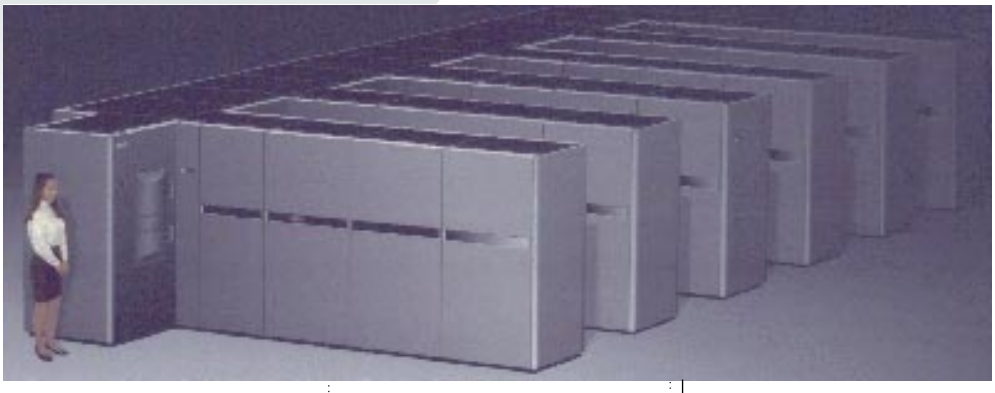
New developments in data storage formats allow tapes to hold enough information to keep NASA happy.

AT THE INAUGURAL Comdex UK show last Spring, Sony quietly introduced a new storage format that promises to reduce costs and increase capacity. Its technology is not revolutionary, but its ultra-fast transfer rates and ultimate capacity is what sets it apart.

The new Digital Tape Format (DTF), like many formats that are now widely used in computing, such as DAT, originated outside the traditional computing arena. DTF is based on video technology developed by Sony for the professional broadcast industry, where it is a world leader.

It uses a tape streamer system capable of storing 42Gb or 12Gb (depending on the size of cassette) of uncompressed data on a single cassette at a sustained transfer rate of a pretty damn quick 12Mb/sec, using a SCSI-2 fast/wide interface The same format, used for broadcasting, can manage transfer rates of 32Mb/sec. The 42Gb cassette is approximately twice the size of its smaller brother, and both use half-inch 14-micron metal particle tape. Sony claims that a single DTF tape drive will back up 42Gb of data in less than an hour.

According to Alan Arthurs, senior manager at Sony Broadcast & Professional Europe, the demand for ever-higher storage limits continues to increase. "We have recognised the huge demand for reliable, high performance data storage products. Professional digital video recorders, by their very nature, offer extremely high bandwidth and massive storage capacity, so it was a natural step to develop DTF," he said.



A PetaSite running a PetaServe system can appear somewhat intimidating

The basic DTF system consists of a GY-10 recorder and a SCSI-2 controller; but high-end systems can be built with automated tape library systems containing multiple DTF cassettes able to store up to 2 PetaBytes. To put that into perspective, Peta is 10^{15} or, in data terms, an astonishing one million gigabytes (1,000,000,000Mb). Even the largest scientific organisations in the world, such as NASA, would be hard pressed to fill such capacity.

DTF systems can be networked across UNIX networks. For smaller organisations a DMS (Digital Mass Storage) Controller sits between UNIX workstations (running either Solaris 2.x, HP-UX or IRIX) on either TCP/IP or Ethernet/FDDI networks. Volume management is dictated either by UNIX shell commands or an API for in-house development of search tools and file display.

Each cassette in the system is presented as a virtual disk that allows sequential read/write access via ftp (file transfer protocol) or NFS. A proprietary FileBank system maintains a database on each cassette, again accessible from command line or API controls. The TCP/IP connection means, for example, that a high resolution weather map can be called up from a DMS box anywhere in the world and displayed on a local workstation.

Larger installations might use Sony's PetaServe, which is an HSM (Hierarchical Storage Management) based system for distributed computing environments using UNIX platforms. It can support a number of different high-performance storage systems, not just the emergent DTF. PetaServe supports Transparent and Automatic file migration and Recall.

Sony will not, itself, be selling badged DTF systems but has licensed a number of OEMs in Europe, the US and Japan. In the UK, Penny & Giles is already marketing DTF systems. One such is its Hermes SCSI-2 data recorder. The company claims an MTBF (Mean Time Between Failure) of 200,000 hours and a typical head life of 20,000 read/write passes.

If you like the sound of 12Mb transfer rates and 42Gb on a single cassette, you might find the prices as awesome as the storage capacities. The basic GY-10 Tape Drive and SCSI controller costs around £50,000! As for the PetaServe systems, they are best left to the US Department of Defense.

PJ Fisher

PCW Contacts

Sony Broadcast & Professional Europe
01256 55011
info@dsp.sbc.sony.co.jp
http://www.nml.org/industry/sony/dtf.htm

Penny & Giles Data Systems
01749 675454

Bluesky

Soup opera

Nobody knows exactly how life on earth began, but a PC-based simulation system may help to solve the mystery.

Over three thousand million years ago, the first life on Earth emerged from a primeval soup of non-living molecules energised by light and lightning. How these molecules evolved the ability to make copies of themselves, the key to life, remains mysterious. Now, a new PC-based simulation system called Amoeba offers the chance for hands-on research. For the first time, self-replicating digital life-forms "living" inside the computer have spontaneously emerged from binary chaos.

The brainchild of Dr Andrew Pargellis at AT&T's Bell Laboratories in New Jersey, Amoeba models the primeval soup as a chunk of computer memory. Each memory address may be occupied by a single digital organism, or "cell". A cell is itself a computer, albeit an extremely simple one: it comprises four storage registers, a program counter, and a sequence of instructions which forms its genetic code. A cell "lives" when it executes its instructions.

Amoeba draws its inspiration from the Tierra simulator developed by artificial life researcher Thomas Ray, but with one crucial difference: in Tierra, life-forms must be manually introduced into the soup; in Amoeba, the soup is seeded with random instructions, and life-forms spontaneously appear, as if by magic.

One reason for Amoeba's fecundity is that its life-forms have a simple structure. The genetic code of each cell is a sequence of up to 30 computer instructions, chosen from a repertoire of 16 possible instructions. These are based on standard operations such as "jump to address", "copy contents of memory location A into memory location B", and "compare registers and skip next instruction". Pergellis has carefully designed his instruction set so that it is possible to create a self-replicating cell with only five instructions (see illustration).

At the start of a simulation run, 70 percent of the soup is seeded with cells containing between 1 and 25 randomly chosen instructions. The remainder of the soup is empty. Amoeba then visits each cell and executes its instructions. At this stage, most cells will contain meaningless sequences of instructions and their execution will have no effect on the soup. A few cells, however, will by chance contain instructions that access other memory locations, copying instructions there or exhibiting viral behaviour by invading another cell and executing its code. Whenever all 1,000 locations in the soup contain code, Amoeba invokes a "reaper" routine which kills off 30 percent of the cells, and introduces a few new random cells into the soup. A new generation then begins.

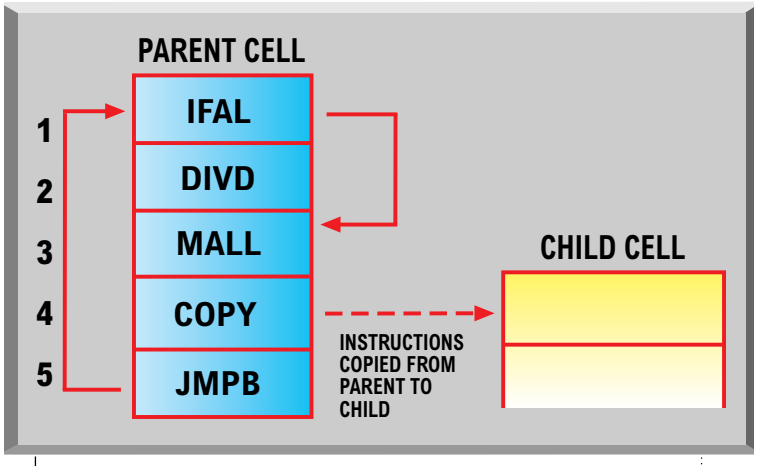
Pargellis found that on average, a self-replicating sequence of instructions would spontaneously arise after about 400 generations. Initially, such "self-reps" were often unnecessarily complex and contained portions of code which performed no useful task, or were skipped over. This is directly analagous to the introns and exons found in real biological genes, where useful genetic information is interspersed with patches of nonsense.

Because cells compete for resources of processor time and memory space, Amoeba models evolution and natural selection. Whenever a cell reproduces, there is a 10 percent probability that one of its instructions will mutate into another instruction. Most mutations spoil the instruction sequence and inhibit further self-replication. In three percent of cases, however, Pargellis observed that mutation allowed self-replication to continue, and led to cells which shed redundant code, lived longer and reproduced more efficiently.

Compared to the richness of nature, Pargellis' system might appear highly unrealistic. But the design concepts are sound. Pargellis says: "I chose a system such that I wouldn't need a substantial fraction of four billion years to see the results."

Although developing software by self-replication, evolution and natural selection sounds like science fiction, Amoeba has already demonstrated the remarkable fact that in the digital world, order can arise out of chaos. Ironic, perhaps, when our experience with today's software is often quite the reverse.

Toby Howard



One of the 16 possible sequences of 5 instructions that can copy itself into another part of memory to create an identical self-replicating "child". Instruction 1 (IFAL) tests whether all five instructions have yet been copied. If not, execution branches to instruction 3 (MALL), which reserves the memory for the child. Instruction 4 (COPY) copies one instruction from the parent to the child, and JMPB loops back to instruction 1. Looping continues until all five instructions have been copied (MALL has no effect once a child has been allocated) when finally DIVD passes control to the child, which will in turn self-replicate

PCW Contacts

Toby Howard teaches at the University of Manchester and edits *The Skeptic* magazine.
For a demo version of Amoeba, and links to Tierra and other Artificial Life systems, visit **http://www.cs.man.ac.uk/aig/alife/**

CUTTING EDGE

Retro

The first Power PC

The Power PC is not quite as young as it seems. More than six years ago we reviewed the first of its kind, the IBM PowerStation 320.

WHAT DOES THE "POWER" in PowerMac stand for? A dig through the *PCW* archives revealed that it's an acronym for Performance Optimised With Enhanced RISC… remember *that* and you could be a star in the kitchen at the next party you attend.

You may think that the Power PC is quite a new machine, yet *PCW* first reviewed one back in 1990 (a long time ago in computing terms). The first Power PC wasn't called that. It was the IBM PowerStation 320, the entry point in a range of machines known as the RS/6000 range. The 320 was a Unix machine with a basic price of £6,400 which didn't even include a decent hard drive (only 120Mb), colour monitor or video card. Instead, you got an ASCII-only display. To get a half-decent colour machine you would have to spend at least £14,000. A 19in monitor cost another £2,000. Working up through the range, it was possible to spend over £250,000 on one machine. A 3D graphics card alone would set you back £60,000.

The modern machine to which the PowerStation bears the closest resemblance is the Apple Macintosh 8200, but the 320 only ran at 20MHz to the Mac's 80MHz and had four Microchannel (MCA) slots in place of the Apple's up-to-date PCI slots.

While the chipset could address 256 terrabytes of RAM, the 320 was limited to 32 megabytes. The biggest disk that could be fitted was only 640Mb, but the machines further up the range, at least, were more expandable. The processor, which later sired the Power 601, had a nine-chip set to incorporate separate branch, floating-point and fixed-point maths processors.

There are some differences between the RS/6000 and the Power 601 but the heritage is clearly there, and anyone brave enough to program in assembler would notice little in the way of changes. The fixed-point unit contained thirty-two 32-bit general-purpose registers, while the float unit was capable of two parallel 64-bit operations (providing they were the right mix).

A 32Kb data cache and 8Kb instruction cache helped pipelining to give a maximum throughput of five instructions per cycle, resulting in performance of a, then, shattering 27.5MIPS (put to shame by a current Pentium). At the time, *PCW* held the opinion that the multi-chip set might make it into a single package to be sold as a mainstream PC, although back then, suggesting that it would be an Apple machine was like saying that the Chief Rabbi was all set for Christmas Mass in the Vatican.

It was envisaged that the low-end machines would run computer-intensive workstation tasks and the high-end machines would be servers, or PowerServers. To this end, they demonstrated the production of high-resolution ray-traced images, and a Mandelbrot which appeared so quickly that, at the time, I assumed it was loaded from disk. The man in the blue suit later assured me that it was calculated.

To perform the server function, there were 64 serial ports. The launch of the RS/6000 was the début for AIX version 3 (the flavour of Unix favoured by IBM) and in many ways this was its downfall. The early nineties ushered in Windows 3.0 and it was clear that the days of DOS dominance were ending. But it wasn't yet clear whether Windows would replace it, and many people backed the Unix horse. Had this even made it to the finishing post, the RS/6000 might have made it as a desktop PC; after all, contemporary 486s were of a similar price. But the plummeting price of the PC, coupled with a less than friendly Unix OS, left it standing in the stalls.

To make matters worse, IBM managed to pluck defeat from the jaws of success by later licensing NeXTStep, an operating system with many of the advantages of NT 4.0; but the RS/6000 version never saw the light of day. It was quite a while before IBM produced anything as innovative as the PowerStation again, but then, the IBM of today is very different to the one of 1990. It makes money, for a start.

Simon Rockman

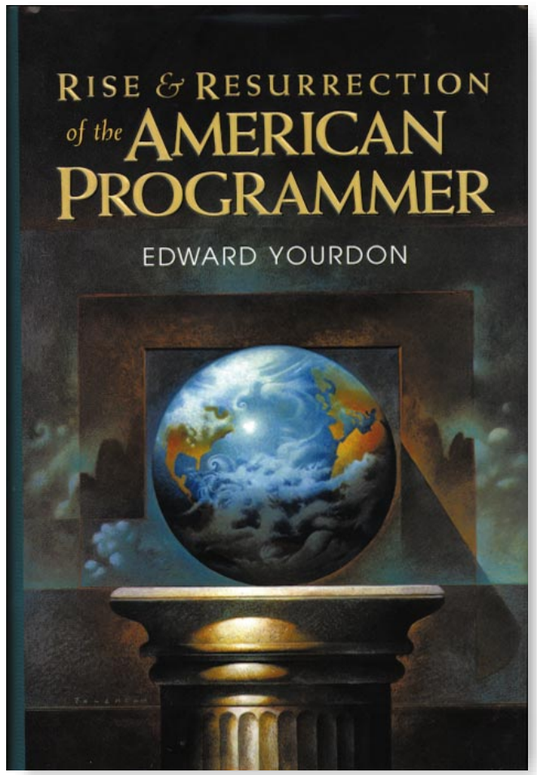
BOOKS

Good news for US programmers, the essential information age handbook, and useful guides to HTML and the Internet, including one that takes you to any musical site you like on the Web.

Rise & Resurrection of the American Programmer
What at first glance appears to be a discourse on the culture and art of programming, turns out in fact to be a dry management textbook. This is not to say it isn't worth reading or that it has no relevance to anyone outside Silicon valley: it is an absorbing read.

Author Edward Yourdon has written 21 books. His previous one was *The Decline and Fall of the American Programmer*, in which he painted a gloomy picture of the decline of the US software industry as it failed to compete with the emerging industries of Asia and India. (One of the surprises of the latest book is the scale and quality of the Indian software industry that it reveals. Motorola, for example, discovered that its Indian subsidiary was generating code of such quality that it was awarded a Level 5 assessment on the Software Engineering Institute's process maturity scale. No other Motorola plant had reached such a level.)

Mostly the battle was about cost; the Asian companies can undercut the labour costs of their US rivals by huge margins. But it was also about quality, and the real worry for the US was that other countries were producing good code at unbelievably low costs. Figures for 1995



showed that an Indian development programmer took home around $9,600 per year compared to $42,621 for his American counterpart. Although Indian salaries are starting to creep up, there are other hungry nations such as China, Malaysia and the Philippines eager to take over. So the US was under attack from all sides.

Four years on from the earlier book the situation hasn't changed much. If anything the problem has intensified, but whereas before Yourdon saw little cheer, he now sees new trends in the US which give him cause for some hope.

The book is about the failure of management as much as the culture of programming.

"Though hardware and software technologies change at lightning speed in our field, management and organizational cultures change very slowly," Yourdon says. Programming has undergone its fair share of the downsizing that has swept across America as companies seek to reduce costs.

Visual programming tools and RAD applications have also pushed "old school" Cobol programmers onto the scrap heap. Yourdon's book is not just about software companies such as Microsoft or Borland, but corporate IT departments.

So what is the future? Much of this book gets stuck into fairly advanced management theories, which can be hard going. But it also points to the legitimisation of Good Enough Software (which Microsoft has been advocating for years) and how the Internet and Java present new possibilities for programmers and management. (Good enough software is okay as long as your customers can tolerate the bugs, and usually we do.)

Yourdon maintains that the Internet is an American phenomenon and as such offers unparalleled opportunity for the US. I'm not so sure, especially as he asserts that hardly anyone outside the US uses it. I wonder which figures he is looking at?

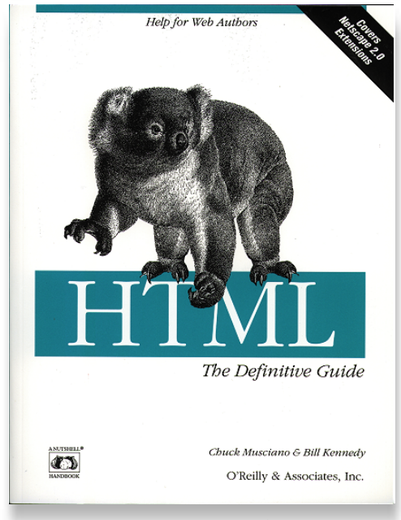
If there is a message here, it is that the Internet promises opportunity for programmers all over the world. Yourdon believes that the US will have a head start in a paradigm shift to Internet "cottage programming" because of the infrastructure and modem spread that already exists in the US. But surely it would be even easier for emerging technologies to achieve parity in building information highways – far easier than building whole software factories?

As for Java, Yourdon believes that it will be as significant as the arrival of PCs and MSDOS in the 1980s in changing the industry. We shall see.

Microsoft of course gets its own chapter with the conclusion that to write it off because of the above cultural changes would be foolish. He closes by saying, ominously, that "the hackers have grown up". Grown up and got faster.

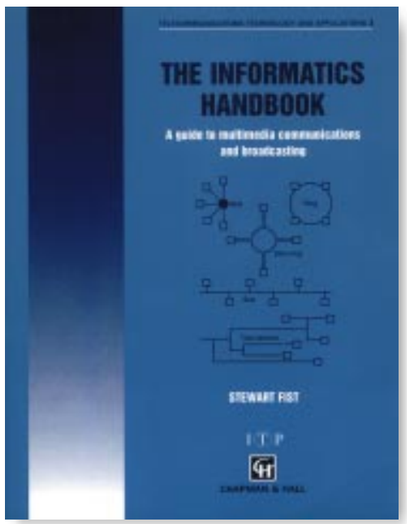
Whether you are a programmer, head an IT department or simply take an interest in the world's most fascinating industry, Yourdon's book is worth seeking out. You may not read it cover to cover but you will certainly find parts of it difficult to ignore. And it is something of a bargain.

PJ Fisher



Rise & Resurrection of the American Programmer
Author Edward Yourdon
Publisher Prentice-Hall
ISBN 0-13-121831-X
Price £12.50
Rating ✎✎✎✎✎

The Informatics Handbook
Don't be put off by the dull blue cover or the title: this is one of the best reference books anyone involved in the information industry could have. The subtitle, A Guide to Multimedia Communications and Broadcasting, sums up the scope of this excellent manual. Over 700 pages cover virtually every computing term, plus those from industries that are starting to converge such as broadcasting and telecommunications. The definitions have been well researched by freelance Stewart Fist, whose only omission I could find was Java.



Makes a change, I guess.

PJ Fisher

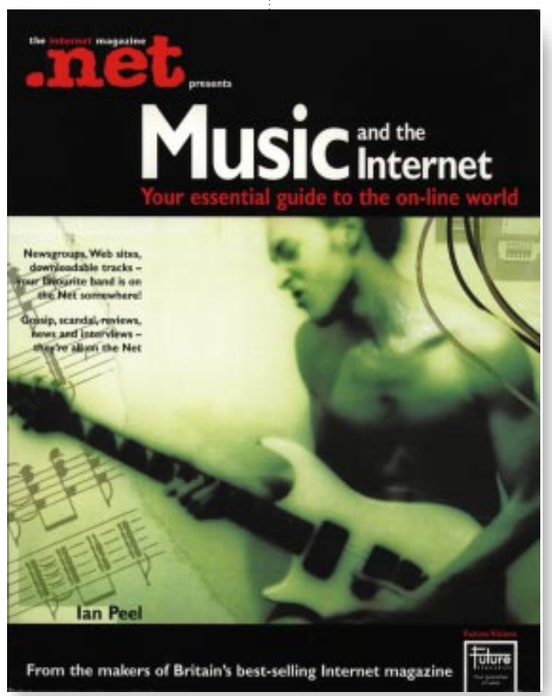
The Informatics Handbook
Author Stewart Fist
Publisher Chapman & Hall
ISBN 0-412-72530-4
Price £29.95
Rating ✎✎✎✎✎

HTML The Definitive Guide
HTML guides are about as rare as a Manchester United supporter these days, so why do we need another one? Well, this one from O'Reilly comes with a fine pedigree and doesn't promise to turn you into a guru in 21 days. Instead, it sticks to the facts about HTML and doesn't pretend that it is anything more exciting than a Document Type Description. That said, it does cover Netscape 2.0 extensions and other multimedia gizmos which will appeal to those with ambitions to create anything more than a personal home page. It also has a handy pull-out reference card. There's no colour and little excitement here, but as a useful text book this guide justifies its price tag.

PJ Fisher

HTML The Definitive Guide
Authors Chuck Musciano & Bill Kennedy
ISBN 1-56592-175-5
Price £20.50
Rating ✎✎✎✎✎

Music and the Internet: Your Essential Guide to the On-line World.
Have you ever had the feeling that you've read just about enough about the Internet? Well, if you haven't, and you happen to be a music nut who just happens to own a computer that



CUTTING EDGE

happens to be attached to a modem, then you may want to happen upon this book.

Ian Peel's work is one of a series of Internet self-help style books from Future Publishing designed to guide an interested reader to finding their niche on the Net. Peel accomplishes this, for the most part, well.

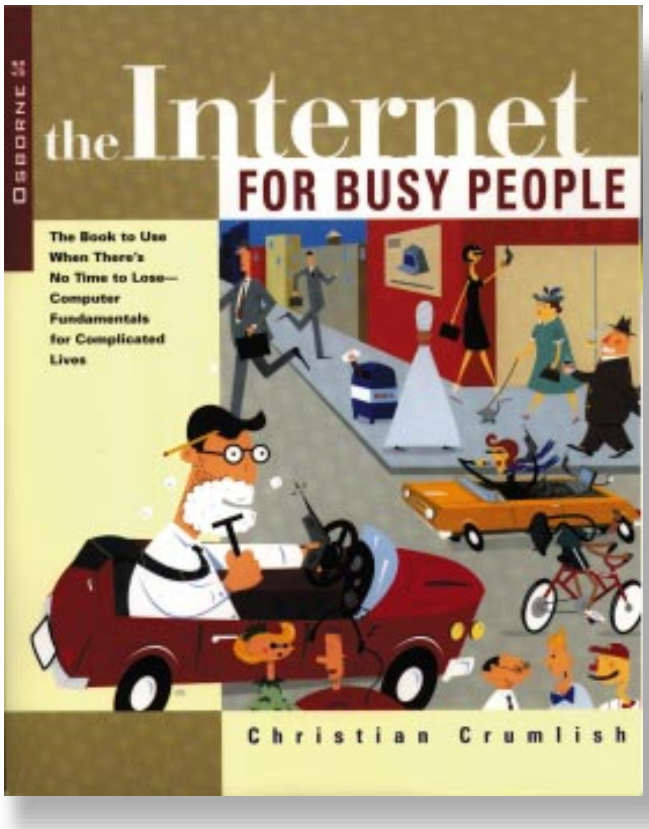
The book covers the whole range of music-related topics on the Internet, as well as explaining the origin of the Internet itself and basic terms and topics such as email, Usenet and the World Wide Web. From there he moves on to the various tools one can use to access a multitude of music-oriented sites on the Net; downloading music sound clips, video clips or plain photo images are all covered.

The book's strength is that it covers the whole range of music and related topics. Do you want to know where to find out about Acid Jazz? Or Madonna? How about classical music and opera? Whatever your taste, Peel appears to have all the right directions to get to your Internet destination.

The biggest strengths of the book are the extensive Web-site listings of all things musical. The biggest weakness is that it reminds you of the text books you had to read in fifth year. Its style is condescending, with its "wow, isn't this neat" and "you, too, can do this". If that type of book drove you crazy at school, then you might want to avoid a sense of *déja vu*, save yourself £12.99 and just explore the Internet on your own.

Dylan Armbrust

Music and the Internet: Your Essential Guide to the On-line World
Author Ian Peel
ISBN 1-85981-059-4
Publisher Future Publishing
Price £12.99
Rating ✎✎✎✎✎



The Internet For Busy People

The Busy People series has been created by Osborne/McGraw-Hill for "people who want to learn the essentials at high speed". Today's hectic lifestyles mean it's rare that we have the time to learn a fraction of what we'd like to know. If there's a quick way to cram that knowledge into our heads, we'll probably grab it without hesitation.

The book's introduction claims "the 'digital revolution' has given with one hand, creating all kinds of rapid means of electronic communication, and taken away with the other, accelerating everyone's expectations and constantly moving the goalposts. For many, life has become a treadmill with someone quickening the pace each day."

The Busy People solution is to sit the author down with you to chat through the intricacies of the Internet as though you were old friends. There are no wasted words and no patronising tone. You get the practical basics quickly, without complicated theory. You'll learn how to use email, access newsgroups, search the Web and finally set up your own Web site. The book concentrates on the Windows 95 versions of most Internet programs but the information can be applied equally well to other platforms.

Every chapter begins with a "Fast Forward" section which summarises the contents of the chapter and works as a reference guide. Experienced users may find the bullet points the only information they need.

The book is imaginatively illustrated with lively, colourful graphics and offbeat cartoons of "contemporary people-oids", which work as organised margin highlighters to advise you of shortcuts, provide definitions and cautions, or point out good habits to develop.

Look out for *Web Publishing for Busy People*, a forthcoming title in the series. Written by the same author, it provides step-by-step instructions on HTML, and how to design and manage attractive Web pages.

Joanna Scott

The Internet For Busy People
Author Christian Crumlish
Publisher Osborne/McGraw-Hill
ISBN 0-07-882108-8
Price £16.95
Rating ✎✎✎✎✎

Top Ten Books: August 1996

1	Java in a Nutshell: Desktop Quick Reference	O'Reilly	£10.95
2	CGI Programming on the World Wide Web	O'Reilly	£26.00
3	Visual Basic Programmer's Guide to Win32 API (Book/CD-ROM)	Ziff-Davis	£46.99
4	Programming Perl	O'Reilly	£22.00
5	More Effective C++	Addison-Wesley	£22.95
6	Teach Yourself Java in 21 Days	Sams.net	£37.50
7	Programming Windows 95 (Book/CD-ROM)	Microsoft Press	£46.99
8	Microsoft Windows 95 Resource Kit (Book/CD-ROM)	Microsoft Press	£46.99
9	Core Java: SunSoft Java Series (Book/CD-ROM)	Prentice-Hall	£32.95
10	Using Lotus Notes 4: Special Edition (Book/CD-ROM)	Que	£46.99

List supplied by The PC Bookshop, 11 & 12 Sicilian Avenue, London WC1A 2HQ
Tel: 0171 831 0022. Fax: 0171 831 0443

Kids' Stuff

Paul Begg sticks with it to make magnets, explores the world and Sesame Street, meets Witches and Dragons, and says hello to Grandma... she doesn't have big ears, though.

COMPUTERS ARE GREAT THINGS, BUT WE DON'T want our kids to sit in front of them all day. I like software which encourages children to do things away from the keyboard.

In this respect, art and craft packages are brilliant. A couple have come our way this month. One of these is the PrintPaks Magnetic Kit.

PrintPaks Magnet Kit

This is a fun way to construct small magnets (like fridge magnets) to your own personal designs. Children can make them and give them away as useful and attractive little gifts.

PrintPaks has been designed specifically for five- to 12-year-olds. Very simply, kids create a design using either their own artwork (a family photograph, for instance) or the artwork provided. Then, they print it on the special paper which comes with the pack and attach it to a thin magnet (also supplied). Your design doesn't have to be a picture: you can create useful lists of family birthdays, important telephone numbers and so on.

Something I particularly liked was the way in which the whole family can become involved: not only can the children make their own magnets, but so can mum and dad!

There are two kits currently available: the Magnet Kit and a Window Art kit. I thought the former was great. I have seen some of the results of the Window Art pack but wasn't so impressed with it: we'll get one for my daughter, Siobán, to sample and let you know what we think.

Other packs are available in the US, which include a kit for making personalised party invitations, hats, banners and so on, and an interesting-looking kit for printing iron-on transfers for T-shirts. I look forward to trying these out soon.

The PrintPak kit arrives with everything you need: the special paper, magnetic sheets, and a CD-ROM carrying the designs and artwork. The software also has Max, an animated dog who is your guide throughout. If your children need help, Max is a mere mouse-click away.

PrintPaks Magnetic Kit is a fairly demanding package, requiring 8Mb of RAM, 10Mb of hard disk space, a CD-ROM and sound card, and a colour printer. It supports Hewlett-Packard DeskJet 540, 560, 600 series and 850 series (PrintPaks was founded by Judy MacDonald, a former product marketing manager for Hewlett-Packard), Cannon BJC-600 series, BJC-400, Epson Stylus Colour. You can get refill paks for around £7 and can order direct via a free-phone number.

If I have any criticism at all, it is that the pack has only enough special paper and magnetic plates to make a dozen magnets. This does tend to limit the creative spirit somewhat, especially if you have more than one child or if you want to make some magnets of your own, allowing for wastage due to experimentation. A couple of dozen sheets of paper and a couple of extra magnetic plates would have been welcome.

Great craft ideas — here you can make magnets

My First Amazing World Explorer

The second "away from the computer" pack is My First Amazing World Explorer

CD-ROM Activity Pack.

It is more "away from the computer" than the Magnet Kit because the box contains an Activity Book with quiz questions, map puzzles to solve, and lots of things to draw and colour. There is a Map Book, too, with information and assorted activities to teach children how to read and draw maps. It shows such things as where in the world animals live and where different foods are grown. There's also a rather smart 80-piece jigsaw puzzle and a map of a treasure island which you can customise by attaching the stickers supplied.

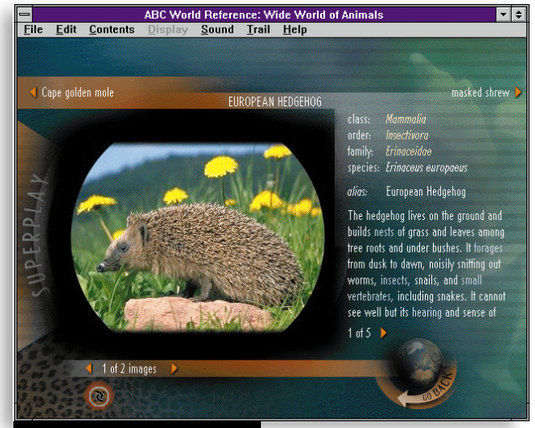
Unfortunately, the CD-ROM is disappointing. I have this growing feeling about Dorling Kindersley that although the products look good and have lots of fun hotspots producing sounds and animations, when you get down to the actual information they contain, it's a bit thin on the ground.

Siobán is off to Paris in a couple of weeks with her school and it would have been useful if I could have shown her pictures of the places she may see, or played her the French National Anthem, or shown her what French money looks like, or let her learn a little about the history of Paris. But none of this was available. There isn't much in the way of video or pictures, either.

Although the age range is shown as four to nine years, the upper age group guide is a little optimistic and overall it has to be said that this pack looked great but lacked a lot. You would probably be far better off with a book and will have saved some money in the process.

Wide World of Animals

Shortage of information isn't something you can complain about with the Wide World of Animals, a new CD-ROM from Creative Wonders, a company created as a joint venture between Capital Cities/ABC and Electronic Arts, which has absorbed Electronic Arts' EA Kids and EA World titles.

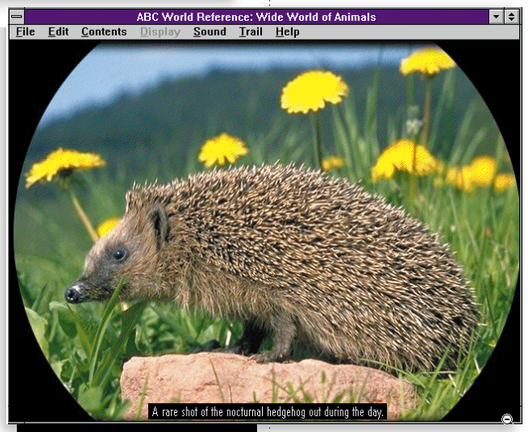


Packed with information and great pictures…

Wide World of Animals is an extraordinarily detailed exploration of over 700 species of wildlife around the world. The photographs are superb, the video is excellent and the sheer quantity of information cannot be faulted. You can search for whatever animal takes your fancy and information is provided on one or more data cards. Each card contains at least one photograph of the animal, directions to related species and a "See Also" button.

There are numerous ways in which to explore. For example, having selected an animal, you can learn about its biome (a regional or global community characterised by the dominant plant life and the prevailing climate). You can explore a species' "political world" and "topographical world".

In fact, there are many ways in which you can explore: take a Taxonomy Tree, for example, which shows you the relationship between your chosen animal and others; the Taxonomy Tree provides you with class, order, family, genus and species. There are video documentaries, country and animal statistics, a diorama, time lapse and more. This is a superb disc — great for adults as well as children.



…which you can enlarge for greater detail

For what you get, it isn't that expensive, especially if you think of a CD-ROM as a book and video combined. Nevertheless, I still think £40 is quite a lot of money to fork out.

● Art Workshop ● Let's Make a Word

Also from Creative Wonders is a range of titles featuring the Sesame Street characters.

A few months ago we looked at some Sesame Street software and complained that it didn't feature the Sesame Street voices. The same cannot be said of this range of software. Not only does it feature the actual Sesame Street voices, but the software has been designed by Sesame Street's own creative geniuses at the Children's Television Workshop.

There are many titles in the range. I took a look at the Art Workshop and Let's Make A Word. Both are aimed at the three- to six-year-old age group but I enjoyed them nevertheless!

Let's Make A Word is designed for pre-school children who have mastered their alphabet. It is set on the stage of a gameshow called "Let's Make A Word" hosted by Guy Smiley, your guide through 24 different word activity combinations. It teaches phonetics, spelling, vocabulary (over 300 new words), rhyming and… Spanish (well, it *is* American, so has also been designed to appeal to Hispanics).

Art Workshop is a simple, fun, art program. It features Stickers, in which you pick a background and the pictures to stick on it. And there is Costumes, where you choose pictures of a Sesame Street character and dress it. In Colouring Book, you choose a picture to colour and there is a simple Paint program which children can use to create their own pictures. You can save the artwork and use it as a screensaver. With a bit of imagination, you can use the software to make personalised Muppet birthday and other cards, create finger puppets, or simply print out the pictures for your child to colour, away from the computer.

Sesame Street Art Workshop — an art package for little ones. Good fun

● Winnie the Witch ● Dragons!

This month has brought a clutch of animated storybooks, all of which do pretty much the same thing: namely, to tell you a story accompanied by animation and multimedia hotspots which cause something to happen when you click on them. I remain just a little dubious about these programs, preferring to read a bedtime story from a book, but they are certainly far superior to videos.

Of the titles to come our way this month, one is an Anglicisation of an old favourite, two take a slightly different approach and the last is a classic tale. All are worth taking a look at if you get the chance.

Winnie the Witch and Dragons! are two new story books from Oxford University Press. Winnie is written by Valerie Thomas, illustrated by Korky Paul, and narrated by comedienne Sandi Toksvig. It is a slight departure from the usual format of a page-by-page storybook with hotspots on each page. In this case, you can explore Winnie's black house room by room and enjoy tons of hotspot animations in each room. Alternatively, you can click on Winnie's book and either read the story or have it narrated. Or, you can click on Winnie's projector and watch a six-minute animated story narrated by Ms Toksvig.

But there is more. As you explore Winnie's house, keep an eye out for her magic wand. When you find it, click on it to get magic powers. Your powers are different according to which room you are in. For example, in the kitchen you can make spells, in the bedroom you can add some colour, and in the attic you can make musical magic. The whole adds up to a fun story, brilliantly narrated and providing quite a treat.

Smashing drawings and great narration in Dragons!

Winnie the Witch — a new approach to animated storybooks

Dragons!, narrated by

MICROMART
CLASSIFIED

One of the perils of having a black cat in a black house!

comedian Harry Enfield and (again) Sandi Toksvig, is written by John Foster. Korky Paul's excellent illustrations are once again in evidence. It follows the same pattern as "Winnie" in that you can visit the Dragon's Lair, the Song Poems or the Library.

Music and poetry play a great part in this story and the CD can also be used with your audio CD player, so the children can listen to their favourite songs and poems whenever they want.

Tom Sawyer

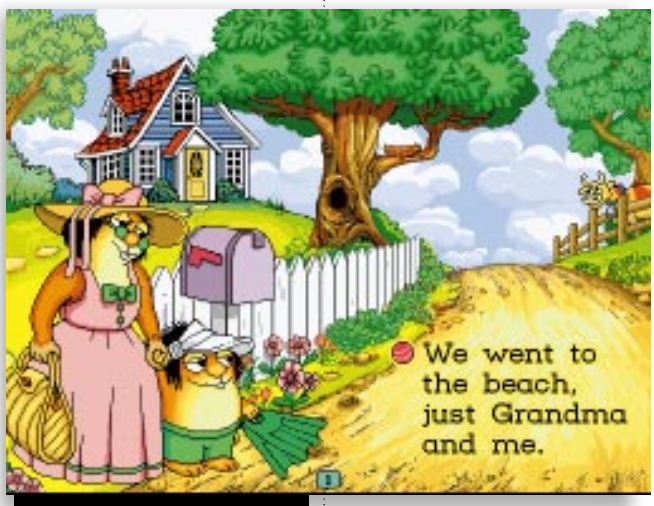
Hot on the heels of Europress' The Gingerbread Man (reviewed last month) comes Tom Sawyer, the latest in the series of Living Classics. The graphics are excellent, the sound is outstanding and the narration should win prizes but, as ever, it is Mark Twain's story which captures and holds the attention.

The CD-ROM is better than an animated video because you can read along with it — and even though it's abridged, the words are Twain's own. Excellent stuff, and not badly priced either.

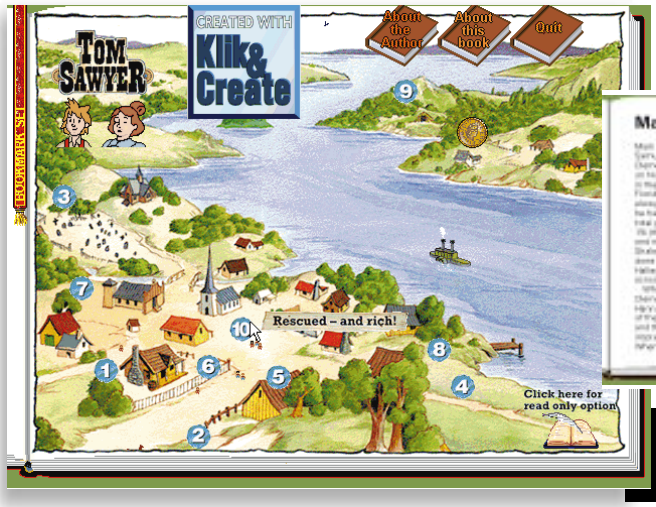
Just Grandma and Me

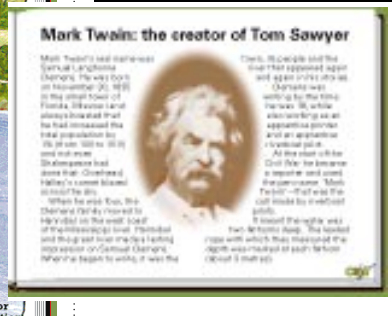
Finally, I will make a very quick mention of the excellent Living Books series. These have been localised — English spelling, narration and so on. The first localised title to reach me is Mercer Mayer's delightful Just Grandma and Me.

The original American narration possessed a certain charm and I had feared that this charm would be lost with the use of English accents. However, I am happy to say that nothing was lacking. Keep an eye out for it: the localised version now meets all aspects of Reading Key Stage One of the National Curriculum.



Localised — yet the charm remains





A potted biography of Mark Twain accompanies the story

Nicely drawn — Tom Sawyer goes multimedia!

PCW Details

PrintPaks
Price around £26
Contact PrintPaks Europe
Tel 0181 876 0880;
fax 0181 876 0880
Rating ★★★★★

My First Amazing World Explorer
Price £29.99
Contact Dorling Kindersley
Tel 0171 836 5411;
fax 0171 836 7570
Rating ★★☆☆☆

Wide World of Animals
Price £39.99
Contact Creative Wonders
Tel 01753 549442;
fax 01753 593579
Rating ★★★★★

Sesame Street: Art Workshop
Price £29.99
Contact Creative Wonders
Tel 01753 549442;
fax 01753 593579
Rating ★★★★☆

Sesame Street: Let's Make A Word
Price £29.99
Contact Creative Wonders
Tel 01753 549442;
fax 01753 593579
Rating ★★★★☆

Winnie the Witch
Price £29.99
Contact Oxford University Press
Tel 01865 267815;
fax 01865 267990
Rating ★★★★★

Dragons!
Price £29.99
Contact Oxford University Press
Tel 01865 267815;
fax 01865 267990
Rating ★★★★★

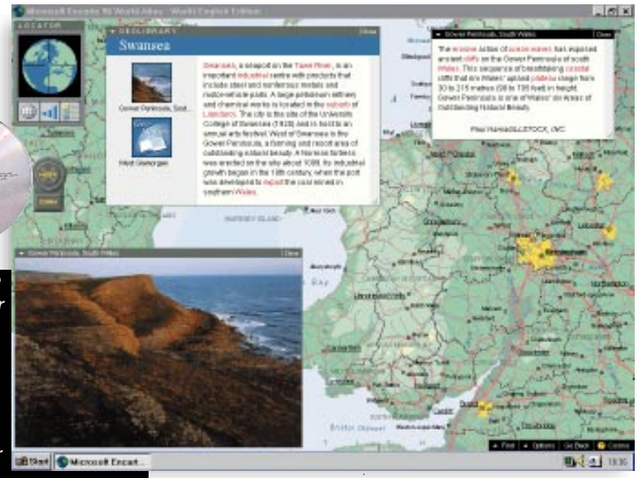
Tom Sawyer
Price £19.99
Contact Europress
Tel 01625 859333;
fax 01625 879962
Rating ★★★★★

Just Grandma and Me
Price £30
Contact RandomHouse/ Broderbund
Tel 01429 520250
Rating ★★★★★

(All prices quoted include VAT)

CD-ROMs

Travel the world with Encarta Atlas, meet this century's biggest stars or learn about astronomy. If you still can't get enough sport after Euro '96, study some soccer trivia or browse through Olympic Gold.



Right *Welcome to the hillsides of the Gower Peninsula*

Below *You could cheerfully send little Cosmo to the Siberian salt mines and never shed a tear*

Microsoft Encarta 96 World Atlas — World English Edition

Microsoft has never been known to hide its light under a bushel, so the marketing spiel for the Encarta 96 World Atlas calls it "the most detailed map ever created". Whether or not that statement is entirely accurate, there is no denying that this is an extremely detailed atlas.

When you first load the CD, you are presented with a globe to spin, until you find exactly where you want to go. A zoom facility lets you get much closer to the surface. One nice touch is a little box telling you the exact longitude and latitude of the place beneath which your cursor is resting.

Magnification goes up to 1:200, which is enough to let you see an area in some detail. Enough, for example, for many villages to be included. I looked at Warwickshire, which is jam-packed with tiny villages. I was surprised by how many of the larger villages had been included. However, looking at the Cotswolds, just south of Warwickshire, some of the real tourist attractions had been omitted. Presumably Microsoft doesn't want to tread on the toes of AutoRoute's, its map and route finding software.

True to form for many CD atlases, this is more than just a map and includes plenty of information on each of country visited: there are statistics on all the usual things like population, gross domestic product and the principal industries but these have been fleshed out in a couple of ways. By clicking for information on a particular country, you are presented with a series of photographs of that country and its people, together with captions. In addition, there are the "Culturgrams" and the Family Portrait album. The Culturgrams give you a lot of detail on subjects such as education, healthcare, religion and customs. The family portraits provide a more intimate view of everyday life around the globe.

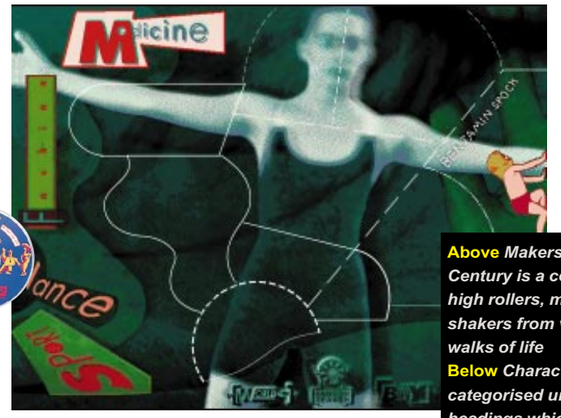
Not every country is covered, but enough to give you a good idea of several cultures.

One serious disadvantage is that it only runs under Windows 95, so if you have yet to upgrade from 3.1 this could turn into an expensive purchase. The other annoyance which, thankfully, you can switch off is Cosmo, a little figure designed to help you find your way about. He may be cute, but he is just too annoying, especially when he knocks on the glass of your monitor to tell you to do something.

These irritations aside, it is a very polished product. It is aimed a little too heavily at the educational market for this adult to be entirely satisfied by it, but it is nonetheless an impressive reference tool.

Adele Dyer

Microsoft Encarta 96 World Atlas
Contact Microsoft 0345 002000
Price £49.99 (incl. VAT)
Rating ● ● ● ● ❍



Above *Makers of the 20th Century is a collection of high rollers, movers and shakers from various walks of life*

Below *Characters are categorised under headings which pull no punches: Kafka is filed as "Troubled Soul", presumably because he was dominated by his father*

Makers of the 20th Century

Rupert Murdoch has edged one step closer to world domination of the media by setting up News Multimedia. As a subsidiary of News International, it is making use of the huge resources there to put together CDs.

Makers of the 20th Century is exactly what you would expect — a collection of all the movers and shakers over the last 96 years. So Adolf Hitler nestles alongside Margaret Thatcher and Stalin, Rudolf Nureyev rubs shoulders with Henri-Cartier Bresson and Madonna, while Marie Curie is the unlikely bedfellow of Robert Oppenheimer.

The CD doesn't attempt to tie the various characters into a coherent history. It lets them stand on their own merits, or infamy. It does make sense because they come from disparate fields — politicians and sportsmen are not usually regarded as having the same influence on world events. It categorises them by such delicious headings as "violent death", "much-married" and "multi-millionaires".

There are six worlds from which to choose: senses, design, power, mind, body and discovery. Not all the categories are as obvious as it would at first appear. The body world covers not just medicine but also fashion, dance and sport. Bill Gates is in design, not discovery, but otherwise most of the classifications are fairly sensible. Each world has its own interface, from VR rooms for the mind category, to a dancing girl for the body section. In fact, the interfaces are probably the most fun parts of the disk.

Each person featured has their own introduction, a kind of resumé, as well as articles from the *Times* and the *Sun*. These often cover the same stories, but from very different perspectives and with very different facts. The net result is a very entertaining package.

Adele Dyer

Makers of the 20th Century
Contact News Multimedia
0171 782 3982
Price £44.99 9 (incl. VAT)
Rating ● ● ● ❍ ❍

Discover Astronomy

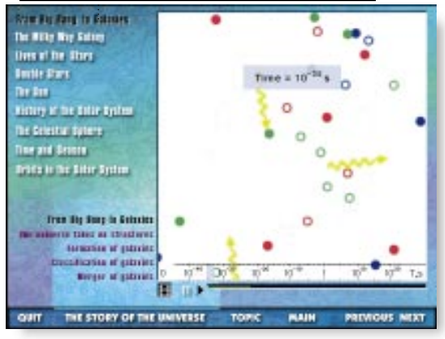
Discover Astronomy is from the same people (Maris Multimedia) that brought you Redshift. Unlike Redshift however, it is intended as a beginner's guide. You do not need to have a clear idea of any of the principles involved as all is explained.

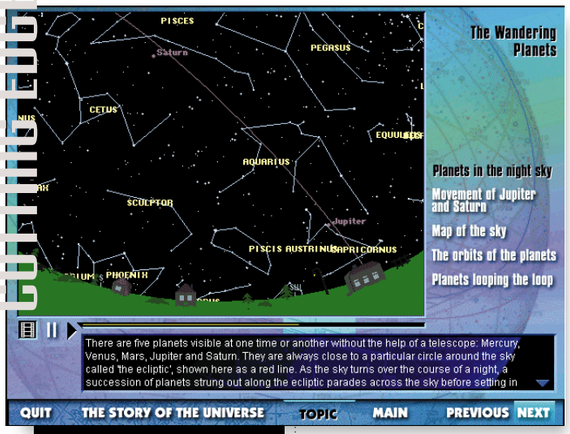
At first glance, the CD is a little unimpressive. The topics section consists of a series of views of the night sky, with animation to show how the stars and planets move during the hours of darkness. There is a short piece of text and a few hypertext links to boxes on astral bodies, but none of this is very exciting.

The CD really takes off in the Story of the Universe section. It is narrated by Hannah Gordon, but written by Jacqueline Mitton, author of the Penguin Dictionary of Astronomy. About a dozen subjects are covered, from the Big Bang to explanations of time and reasons. The commentary is detailed and demands a certain amount of concentration, but is extremely rewarding. The content is comprehensive and can deal with most questions you might have. Nothing is so complicated that it has to be left half-explained, but at the same time the CD covers a lot of tricky issues.

The animations in this part are equally impressive. They demonstrate some quite involved concepts in such a way that it is immediately apparent exactly what is going on. The events surrounding the Big Bang and the formation of neutrons and protons is a piece of cake

Surf the Galaxy, with Discover Astronomy — watch out Patrick Moore!





Hard facts for the starry-eyed

when you see them swirling in front of your eyes. For a beginner, Discover Astronomy is an incredibly good bargain

Adele Dyer

Discover Astronomy
Contact The Upgrade Network 0181 943 4393
Price £17.99 (Incl. VAT)
Rating ● ● ● ❍ ❍

The Ultimate Encyclopaedia Of Soccer

Any soccer encyclopedia which bills itself as "The Ultimate" and then omits even to use a picture of Eric ("The King") Cantona himself, is asking for trouble. But I'll forgive it just this once as it is otherwise an admirable attempt to wrap up the world's most popular game.

There's nothing worse than a CD-ROM that skimps on video and thankfully the Ultimate Encyclopaedia delivers in this department: it's especially important for any sports-based title, otherwise what's the point in just reading about great goals when what you really want is to see them repeated. The clips are small but smooth though a few MPEG clips would be welcome.

Many of the great defining moments in world football are here: Banks' save against Brazil; Pele's strike from the halfway line; England's shock Wembley defeat by Hungary in 1956; and Manchester United's European Cup win in 1968. Most are accompanied by text, narration or video clips.

An outstanding History Of The Game section uses video clips and stills to tell how "the people's game" was, in reality, developed by English public schools and elite universities before being spread around the world by British sailors.

Similar techniques are used to tell the life stories of great players including George Best, Pele, Maradona and Cruyf. The CD is let down by poor text design which makes it difficult to find the sentence you were reading before scrolling down. All sections suffer from this. And spelling mistakes suggest sloppy editing. The narration is in English but prone to clichés at times: "FIFA was born and the rest, as they say, is history". And as they say, "Thanks, Trevor".

There is a quiz, too, and a Video Vault where you can pick a video clip at random.

You are supposed to be able to get updates for this CD from a web site. Unfortunately the server was down when I tried.

Overall, this is a more complete experience than most CD-ROMs, and actually scores by not being overdressed. It's easy to find your way around and it doesn't waste time on pointless graphics and state-of-the-art (*viz.* impossible to decipher) interfaces. A result.

PJ Fisher

United they stood: Nobby Stiles, George Best and Bobby Charlton, three of the best from the Ultimate Soccer Encyclopaedia

The Ultimate Encyclopaedia Of Soccer
Contact PNE 0171 331 3920
Price £29.99 (Incl. VAT)
Rating ● ● ● ❍ ❍

Olympic Gold

You could be forgiven for thinking that technology has become more important to the Olympics than the athletes themselves. IBM has made a great splash this year:

transferring results from the officials' Thinkpads to the Internet within a matter of seconds; and the security measures such as hand-print scanning of all athletes, officials and trainers when they walk into restricted areas.

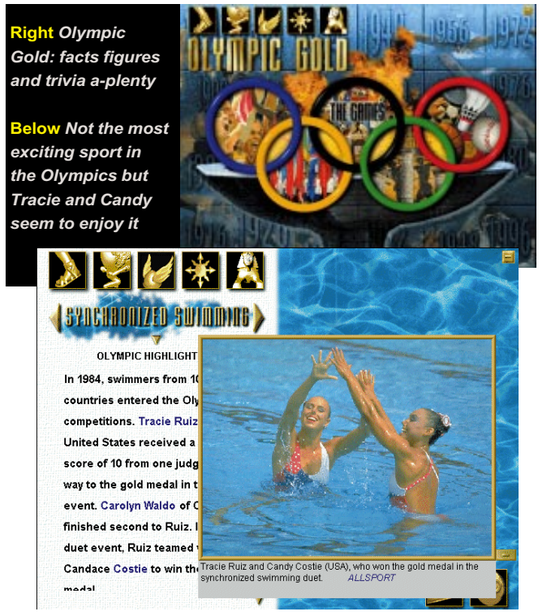
The CD follows the trend of many sport CDs, being more heavily into facts, figures and trivia than the games themselves. There is, of course, plenty of information on each of the games: who played and how they played. Apart from a few photographs, there is little to get you excited about the sports. There are no video clips and many of the photographs are of athletes standing on a podium collecting their medals. Not exactly heart-stopping stuff.

The text included is lengthy and detailed but it does not scroll smoothly and the choice of what to include and what to leave out seems haphazard at times. In addition to the sports data, you can track the history of the games and each of the nations involved. You can update the information included on the disk, so it will not be out-of-date before you have even loaded it.

The good news? You can win one in our competition this month, on page 260.

Adele Dyer

Olympic Gold
Contact Astrion 0181 202 0011
Price £39.99 (Incl. VAT)
Rating ● ● ● ❍ ❍



Right *Olympic Gold: facts figures and trivia a-plenty*

Below *Not the most exciting sport in the Olympics but Tracie and Candy seem to enjoy it*

Masterclips 35000 Premium Image Collection

If you are in the business of putting posters, newsletters or presentations together, then you'll understand the importance of clipart — the stuff that makes your creations live or die.

This CD from MasterClips is packed full of useful bits and pieces: 33,000 clipart samples; 1,000 fonts; and 1,000 photos.

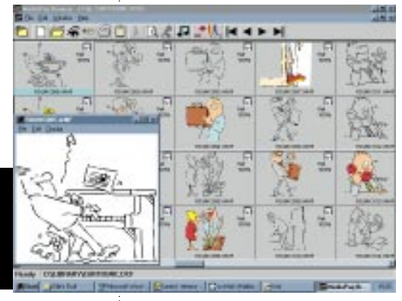
It comes with a browser which acts as a front-end searching tool to help you find your way around the thousands of available pictures.

Across the top of the screen, the contents are divided into categories. These open out into sub-categories which in turn display individual clipart samples. Double click on any one of these and it displays an enlarged image. There's a category of clipart on practically every subject. Many of the more specialist pictures are detailed and accurate. On the fun side, there are collections of cartoons, pop-art and fictional images. There's a variety of artistic styles, and all images are vector-based and can be scaled and resized.

A second CD-ROM is provided containing fonts and photographs. 1,000 fonts is quite a lot to handle, so these have their own browsing tool which allows you to scroll through the list and install the ones you like direct into the Windows directory. There are 150 sound effects for enhancing presentations as well as a bundle of video and animation clips.

There's something on this CD-ROM collection for everyone. Whether you're in the middle of a school project, writing the parish newsletter, or distributing political propaganda, you'll find plenty of clipart to your taste. The RRP for this collection is rather high, but on the street you'll find it a complete bargain.

Eleanor Turton-Hill



Clipart collections to fuel the creative muse

Masterclips 35000 Premium Image Collection
Contact IMSI 0181 581 2000
Price £35 (Street price)
Rating ● ● ● ❍ ❍

Screenplay

EA on the attack

Electronic Arts has gone all out for authenticity with AH-64D Longbow, a warfare simulation featuring what it claims is the most lethal attack helicopter around. There are over 40 missions set in the Baltic region and an additional 12 historically accurate missions, from Desert Storm in the Gulf War to Operation Just Cause in Panama. The development team used real operations manuals and design documents from the aircraft manufacturer, and experts in aeronautical engineering and army intelligence to create the avionics, dynamics and artificial intelligence systems.

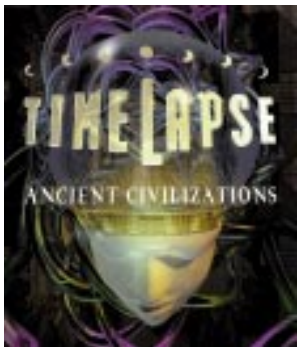
Electronic Arts 01753 549442

Charts

Interactive Leisure Software Limited LEVELONE

1	Duke Nukem 3D (CD)	US Gold
2	Dogz (CD)	Mindscape
3	Civilization 2 (CD)	Microprose
4	Duke Nukem 3D Demo (CD)	US Gold
5	Worms: Reinforcements (CD)	Virgin
6	Star Trek DS9 Harbinger (CD)	Viacom
7	Com. and Conquer: Covert Operations (CD)	Virgin
8	Warcraft 2: Beyond Dark Portals (CD)	EA
9	Command and Conquer (CD)	Virgin
10	Syndicate Classics (CD)	EA
11	Worms (CD)	Ocean
12	Theme Park Classics (CD	EA
13	Nascar – White Label (CD)	Virgin
14	7th Guest – White Label (CD)	Virgin
15	FIFA Classics (CD)	EA
16	Normality Inc (CD)	Gremlin
17	Day of the Tentacle (CD)	US Gold
18	Championship Manager 2 (CD)	Domark
19	Sam and Max hit the road (CD)	Virgin
20	Little Big Adventure Classics (CD)	EA

Time for Atlantis



Due for release this autumn, from GTE Entertainment, is a time-travelling adventure game set in 3D photo-realistic worlds, complete with full-motion video and animations.

Searching for the fabled Atlantis, you must solve puzzles to unravel the intriguing story, which links one ancient civilisation to another, from the Egyptians to the Anasazi. Each one is recreated with artwork, music, sound effects, and depictions of plant and animal life and terrain.

Philips Media
0171 911 3000

Card sharp

Portable Add-ons has launched a PC Card for games. The New Media GAMEjammer adds a built-in speaker and joystick port to the capabilities of a sound card, enabling notebook users to bring "video games alive", says Sandy Pearson, Portable Add-ons' European Marketing Manager.

GAMEjammer is available now at an RRP of £189.

Portable Add-ons 01483 241333

Sony at play

Sony has cut the price of the PlayStation from £299 to £199 in Europe, and is preparing an exciting release schedule of new titles in the hope of attracting new customers to video gaming.

Sony Computer Entertainment
0171 447 1600

Sega plays the PC game

Sega is launching on to the PC platform this summer, kicking off with top title Virtua Fighter PC. Virtua Cop, Sonic 3, Knuckles, and Sega Rally Championship are due to follow in the autumn. Racing games might do well on the PC, but the beat-em-ups could prove tricky to play to their full potential as key-strokes could hinder specialist manoeuvres. We can only hope that Sega will bundle the games with a Saturn joypad.

(Minimum spec: Pentium 60 with 8Mb of RAM.)

Sega 0171 373 3000

Duke Nukem 3D

Price £42.99 (incl VAT) ● **Contact** US Gold 0121 625 3366

"It's time to kick ass and chew bubble gum. And I'm all out of gum." Famous last words...

It's not often we review a game twice in Screenplay, especially when the first review was only a few months ago. But when it comes to Duke Nukem 3D, the latest shoot-'em-up from 3D Realms, we have to make an exception. The shareware version recently took the PC world by storm and in the July issue received our annual Best Game of 1996 award. Now US Gold has launched the full commercial product, and it's better than ever.

Duke Nukem 3D is a Doom clone with better graphics, louder sound and even more addictive gameplay. The game is divided into progressively harder sections, each with a number of sub-levels. As always, you're all that stands between Earth and an alien invasion.

You start out with only a hand gun at your disposal, but

other, more powerful, weapons can be found as you explore. This new version boasts no less than 10 devices including a shotgun, rocket launcher, pipebomb, laser rocket gun and freeze ray. With some of these weapons, great care must be taken. For example, firing a rocket launcher at close range or standing next to a pipebomb when it goes off is not recommended.

Apart from a new startup screen, the other big difference from the shareware is that you now have three sections, or episodes, to complete instead of one. You start off in downtown Los Angeles, go on to a Moon Base, and take part in the final showdown in the aptly-named Shrapnel City. You can play the last episode without completing the first two, but you won't get far without the equipment found on the earlier levels.

Everything else looks exactly the same as before, but the code appears to have been optimised to run faster. This is especially noticeable in higher resolutions and the game zipped along on my trusty Dan Pentium 90.

As standard the game runs 320 x 200 pixels, but players with VESA-compliant graphics cards, or the appropriate DOS drivers, can go to 640 x 480 and beyond.

The level of violence and the occasional digitised expletive have earned the UK release a BBFC 18 rating. However, the authors have included a parental lock mode which lets you play with the mature content turned off. It doesn't make much difference to the game, and it's good to see this issue being addressed.

In addition to the finished game, the commercial CD also includes programs that allow you to edit and create your own Duke Nukem levels.

If you've got the shareware version, then there's no question that you'll want the full product. The only problem I can see is that US Gold could have trouble keeping up with the demand.

Chris Cain

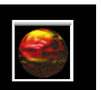
The moonbase holds another set of exciting levels

Alien in the side pocket...

"Touch that energy pod, lady, and you're history."

System Requirements 486 or higher, 8Mb RAM, 30Mb free hard disk space, Sound Blaster, CD-ROM drive
Price £42.99
Contact US Gold 0121 625 3366

Stars!

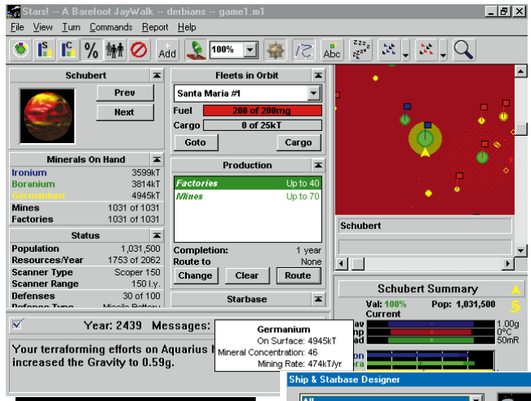


Price $34 (Single copy) ● **Contact** Star Crossed Software 001 503 331 1516

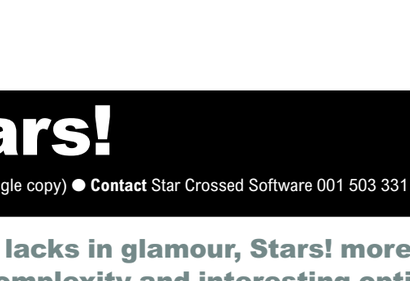
What it lacks in glamour, Stars! more than makes up for in complexity and interesting options.

Stars! doesn't have motion video, sound effects or animation, and it's only just too large to fit comfortably onto a floppy disk, but it's not some late eighties throwback. The latest version, 2.5, has just hit the Internet, making it to fifth on Jojo's chart of downloaded games, and it's one of the most addictive galactic conquest games around.

While it lacks some of the multimedia glamour of games like Microprose's Master of Orion or Virgin's Ascendancy, Stars! has a lot going for it. It's a Windows game, so it uses standard controls and has an extensive help file. And unlike most Windows games, it doesn't need a CD-ROM or a Pentium – it even runs at a bearable speed on the 20MHz 486SX with 4Mb of RAM I've got at home.



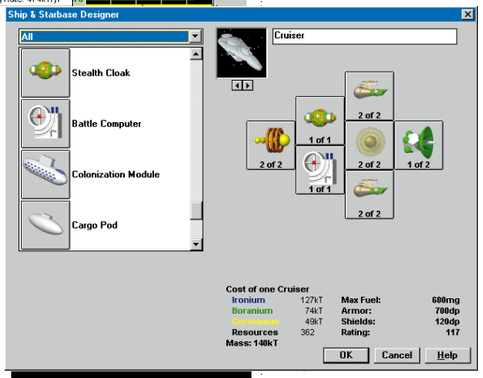
The main screen where it all happens. Note the pop-up help which helps you make sense of most of the elements



The space combat system is not terribly exciting to watch

If you've played galactic empire building games in the past, you'll find the basic outline of Stars! familiar. You need to build up your population, mine for resources and research new technologies to build bigger and better starships so you can send colonists to populate the galaxy and crush your enemies.

The beauty of Stars! lies in its customisability and the number of interesting options it offers. Most similar games involve mining for resources, for example, but if you're bored with ordinary mining Stars! lets you use giant orbital strip miners to pillage uninhabited planets. Instead of transporting minerals by cargo ship, you can use "mass drivers" to fling minerals between the planets; you can even use them to attack enemy planets with man-made meteors. In most games you get several races with special powers; in Stars! you can "design" your own race with its own strengths and weaknesses.



You can create your own ships by mixing and matching components you have designed

In many similar games, you can easily tire of shuffling your units to and fro. But in Stars!, after a little study, you can automate things so your computer will take care of the tedious administration while you concentrate on crushing your opponent.

Most importantly, it was designed from the start to be played between up to 16 players, either by email across a network, or by taking turns on the same machine. If you are on the Internet you shouldn't have any trouble finding opponents, either: there are at least 15 Web pages on which you can register that you would like a game.

Of course, the game is not without its problems. Its sheer depth and complexity entail having to spend several hours playing against the computer and losing before you get a feeling for how long research takes, how fast warp 8 is, or how well defences protect you against the enemy's Annihilator bombs (a thorough tutorial is available). Although you can give quite sophisticated instructions to your battle fleets before combat, you can't control them during battle and the combat display is uninspiring to watch.

You don't need to take my word for it: you can download a free, fully-functional version which is less customisable and lets you build only ten of the 26 available tech levels. If you don't, you'll regret it.

David Brake

System Requirements Windows 3.x or better, 4Mb RAM (8Mb preferred), 6Mb disk space
Contact Star Crossed Software 001 503 331 1516 http://beast.webmap.com/stars!/
Price $34 (single copy); up to $136 for an eight-user bundle plus $6 postage and packing

Star Trek: Harbinger

Price £44.99 ● **Contact** Viacom/CIC 0800 371314

Another everyday story of happy-go-lucky Federation folk to keep Trekkies beaming.

As any Trekker worth their weight in gold-pressed Latinum will tell you, Deep Space Nine is the series that follows Star Trek: The Next Generation. Set aboard an alien space station at the mouth of a stable wormhole, a natural phenomenon that can transport you millions of light years in a couple of seconds, it's an everyday story of happy-go-lucky Federation folk.

Deep Space Nine has action and adventure

Deep Space Nine: Harbinger teams you up with Captain Ben Sisko and crew to save the galaxy. You play an up-and-coming diplomatic envoy on a mission to help make first contact with a new alien race, but before you know it you're attacked by hostile starships, battered about in a plasma storm and involved in a murder case.

After repairing your damaged shuttle with the help of shape-shifting security chief Odo, you're beamed aboard the station and introduced to a few key members of the crew. These include second-in-command Major Kira, and the station's Science Officer, Jadzia Dax.

The new aliens you've come to talk to are the Schythians, a funny old bunch who originate from the Gamma Quadrant on the other side of the wormhole. Without giving too much of the plot away, it appears to be their ships that attacked you and later you discover that a Federation officer has been killed. It's then up to you and the rest of the DS9 regulars to find out who's up to what and why.

Navigating your way around the station is simply a matter of moving a cursor around the screen and clicking in the right places. Unfortunately, the authors have tried to capture a realistic 3D environment which often makes it tricky to get from one location to another. As usual, if you come across any interesting objects along the way, you can pick them up or interact with them.

While most of Harbinger is a classic graphical adventure, there are arcade sections where you can test your shooting skills. For those of a nervous disposition, the game can be set up to save your position prior to any action sequence.

Graphically, Harbinger captures the Star Trek feel, with detailed characters and well-drawn backdrops. The smooth animation is especially good when it comes to Odo, and the video sequences are first class on a Pentium. The sound is even better, with some nice tunes, and speech provided by the original actors.

Aside from the navigation problems, which you learn to live with in time, Harbinger has few faults and is a must for Trek fans everywhere. But if you want an introduction to the Star Trek universe, A Final Unity, based on The Next Generation, is probably a better bet.

Chris Cain

System Requirements 486/66 with 8Mb RAM, 10Mb free hard disk space, DOS 5.0, double-speed CD-ROM drive, Sound Blaster, SVGA, mouse
Price £44.99
Contact Viacom/CIC 0800 371314

Leisure Lines

Brainteasers courtesy of JJ Clessa.

Winner of May 1996 Prize Puzzle

A good response to our weighting factor puzzle: almost 200 entries, most of you getting the right answer. The winning card, drawn at random, came from David Blackburn of South Croydon. He receives heartiest congratulations and a fine prize which should be with him by the time he reads this.

The answers (there were two parts) were:
347615 which gives a remainder of **7**
7249368 which gives a remainder of **9**
Keep trying, everyone – it could be your turn next.

Quickie

Arrange the digits 1-6 to form a 6-digit number so that:
- The first and second digits are even.
- The second digit is twice the fourth.
- The last digit is equal to the fifth minus the fourth.
- The first digit is greater than the second.

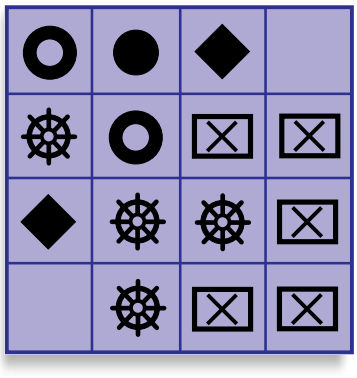
This Month's Prize Puzzle

Each of the five symbols used in the grid below represents a different whole number. Using the row, column and diagonal totals shown, can you determine which symbols should be in the two blank squares? All the total values – row, column and both diagonals – are different.

Send your answer on a postcard or the back of sealed envelope – no letters or floppy disks, please – to arrive no later than 20th August 1996, to:

PCW Prize Puzzle August 1996
P.O. Box 99
Harrogate
N.Yorks HG2 0XJ

Good luck!

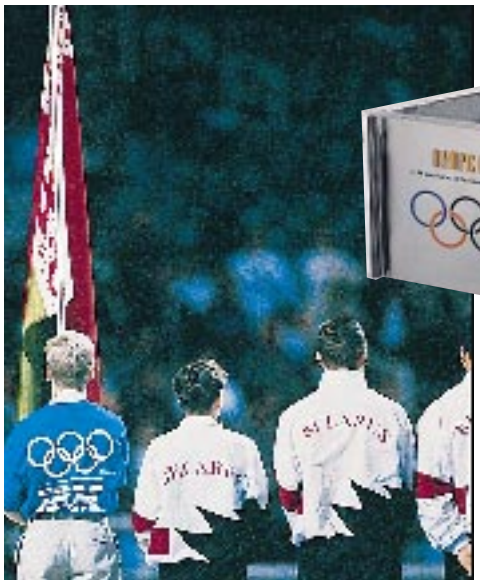


CUTTING EDGE

C O M P E T I T I O N

Win an IBM Aptiva

Go for gold! IBM is giving away a 133MHz Pentium Aptiva as first prize in this month's competition with an Olympic flavour. Plus, 100 other winners will each get an Olympic Gold CD and an Internet access disk.



The Olympic games is the event of the year, but it is also a logistical nightmare — the equivalent of organising the closing stages of 20 soccer World Cups, simultaneously. To keep it all running smoothly, IBM has been involved right from the planning stage of these games: helping the Atlanta Committee for the Olympic Games set up, organise and run the 26th Olympiad.

IBM has developed solutions to deal with everything, from administration to security and creating a home page. Its most visible contribution is the results system, which it has provided since the 1984 games. This year, IBM is providing instantaneous updates and scores for distribution around the world via broadcasters, the press and the Internet. No less than 1,800 touch-sensitive screens will be positioned around the site to give athletes, officials and the media access to all results within two minutes of official verification.

To celebrate its part in the Olympics, IBM is giving away a plethora of prizes. The first prize is the much coveted 133MHz Pentium Aptiva — in fact, the same model we have reviewed in our 133MHz PC group test this month. It comes complete with 16Mb RAM, a 1.6Gb hard disk, a full multimedia kit and a 15in monitor.

One hundred other winners will each receive the Olympic Gold CD (reviewed on page 252) and an Internet access disk.

● **To win the Aptiva or the various other goodies, just answer the following question:**

For how many Olympic games (including the Atlanta games) has IBM provided the scoring system? Is it: **a)** 12 **b)** 4 **c)** 3

Note: If you do not wish to receive promotional material from companies other than VNU Business Publications, please specify this on your competition entry form.

Rules of entry

This competition is open to all readers of *Personal Computer World*, except for employees and their families, of VNU Business Publications and IBM. Entries must arrive by 16th August 1996. The Editor of *PCW* is the sole judge of the competition and his decision is final. No cash alternative is available in lieu of prizes.

How to enter

To enter the competition, just write your answers on a postcard, or on the back of a sealed envelope, along with your name, address and daytime telephone number, and send to: PCW August Competition, CMS Limited, PO Box 11312, London WC2H 0DJ.

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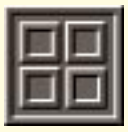

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Hands On is the place where readers can contribute to *PCW*, and as always we'll pay for anything we use. Macros, sections of code and hints and tips will be rewarded with a £20 book or record token (please say which you'd prefer) and we'll pay hard cash for longer, more involved pieces. Please include relevant screenshots in .GIF format.

All submissions should be emailed to the author of the appropriate section or snailmailed to *Hands On*, *Personal Computer World* Editorial, VNU House, 32-34 Broadwick Street, London W1A 2HG. Questions and short hints and tips can be faxed on 0171 316 9313.

We're constantly working to improve the contents of *Hands On*. If you have any suggestions, send them to the Editor at the address above, or email them to: editor@pcw.ccmail.compuserve.com

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The readers **write**…

Tim Nott reviews and passes on your tips and suggestions for CD track list editing and Registry editing to change default folder icons.

We've received a record amount of feedback and tips by post and email in the past few weeks, so this month's column is largely written by you, the readers.

But first, a quick and easy request from Stephen Hollis, who wanted to know: *"Whether it is possible to stop documents from going into the Documents folder on the Start menu. I sometimes have some very private files that I would rather people didn't see."* The short answer as far as I am aware is that you can't stop them, but there are several ways of removing them.

Open the Recent folder in Windows, and you'll see all the shortcuts that appear in the Documents list — you can delete the ones you don't want to appear. If you have multiple users enabled on a machine then each will have his or her list under Windows/Profiles/ Name/Documents. You can also clear the lot by right-clicking on the Taskbar, then selecting Properties/Start Menu/Clear. Note that an independent list is kept in the Registry, at:

```
HKEY_CURRENT_USER\Software\Microsoft\
Windows\CurrentVersion\Explorer\
RecentDocs
```

This isn't deleted by either of these actions and although listed in hex, it wouldn't take much detective work to identify the files involved.

Play on...

As you probably know, the Windows CD player will play audio CDs automatically, given the chance. Alternatively, you can launch the CD player manually. In either case, you have the option of selecting tracks and arranging them into a playlist. If you want to be really tedious, you can even play the same track several times over.

What I only realised recently (and thanks to Paul Sutton for pointing this out) is that you can edit the title and track list. If you pick Edit play list from the Disc menu, you can fill in the artist and title. Click on one of the tracks in the right-hand list and you'll be able to edit the text in the box below it before clicking the Set Name button to add it to the list. (Note that there's a limit on the length of a track name — if you're trying to catalogue Pink Floyd's "Umma Gumma" you're going to run aground halfway through "Several species of small furry animals gathered together in a cave and grooving with a Pict").

The clever bit is that Windows saves this information, along with the serial number of the CD. So when you next stick Mozart or Metallica into the drive, the title, artist and track list appear automatically.

Windows stores all data as plain text in an old fashioned .INI file —CDPLAYER.INI in the main Windows folder. As Paul points out, it's a good idea to back up this file to floppy, especially if you've typed in the details of a large music collection. And, appropriately enough, Paul wins a record token for his efforts.

Windows remembers your CD collection — if you make the effort to type it in

Icon time

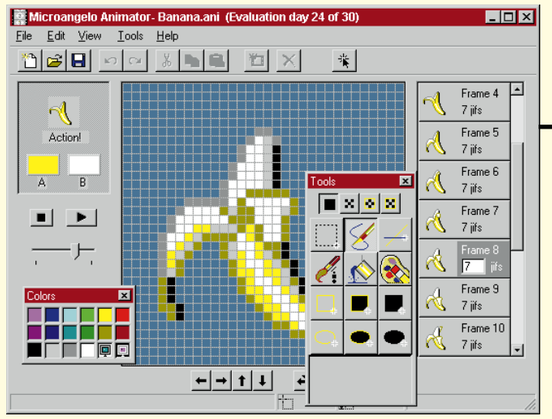
It's time for those irrepressible little fellows again, if you're not all heartily sick of them.

First, many thanks to Mike Peschka, Henry Bevan, Harry Genery, Stephen Taylor, Keith McKay, Jason Ozin, Hoi Lam, Deborah Pate, Stanley Keymer (Finland), Wim Mattaar (Holland) and everyone else who wrote in telling me about the Microangelo icon editor.

Special thanks to Jez Page and Craig Lewin for pointing out that it was on our January issue's cover-mounted CD. Extra special thanks to Gerald McMullen for sending me a whole stack of stuff on floppy disk, including Microangelo version 1 (wake up, Gerald, that's last year's model!), Iconmaster, lots of animated cursors and 13,000 icons, including (nudge, nudge) some X-Rated specimens. Say no more.

For those few readers who didn't write in and haven't heard about Microangelo, the package consists of five modules. The Studio is a straightforward icon editor with tool and colour palettes. It has some nice touches, such as being able to paint in transparent or inverse colour: the first blends in to the colour of the background; the second always contrasts with the background. The Animator lets you create animated cursors using similar tools, frame-by-frame. Each frame can be separately timed by specifying a duration in "jifs" (about 1/60th of a second) — and the cursor "hot-spot" assigned to any part of the image.

The Librarian lets you group individual icons into "libraries" — single files with the .ICL extension. You can also extract icons from .EXE and .DLLs to add to your own library. The great advantage of libraries is the amount of disk space you can save; I've mentioned the cluster factor before, so will just note that 100 icons at 766



Microangelo's Animator for wannabee cursor-Spielbergs

bytes each, stored on a partition greater than 512Mb, will take up 1.6Mb. The same icons in a library take up around 80Kb.

Next, the browser lets you look anywhere for icons and cursors. A nice touch is that the number of icons in a library, .DLL or .EXE, is listed and from here you can open the Librarian or edit individual icons.

Finally, there's the Engineer. This lets you change all the system icons and cursors, including the parts (such as folder icons) that other means can't reach. Microangelo is shareware with registration costing a rather hefty $59. As it's been updated since its *PCW* debut, we've included it on this month's CD-ROM. You can also find it at http:\\www.impactsoft.com or the Windows/Files_32 topic on CIX.

Bolder folders

Many also wrote in answer to the challenge that I offered up on in April's column — how to change the default folder icons. This, as I remarked at the time, doesn't seem to work using Explorer's View/Options/File Types. Craig Lewin, Jason Ozin, Torstein Olsten from Norway and various others all pointed out that you have to edit the Registry. Specifically the entry:

```
HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft
\Windows\CurrentVersion\explorer
\Shell Icons
```

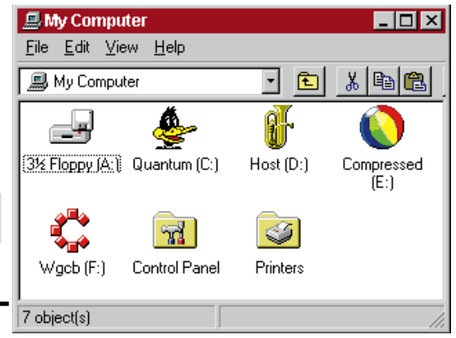
Jason Ozin correctly points out that you won't have this key unless you've installed the Plus! pack or some other software, such as Microangelo, that adds it for you. But that doesn't stop you adding it yourself. Go down the Regedit tree, as above, until you get to Explorer. Highlight it and choose New Key from the Edit menu, and name in place the key Shell Icons. Highlight this key and choose New String Value. Name this with the number 3. Double click on the 3 and a dialogue box will appear. In the

Drive away

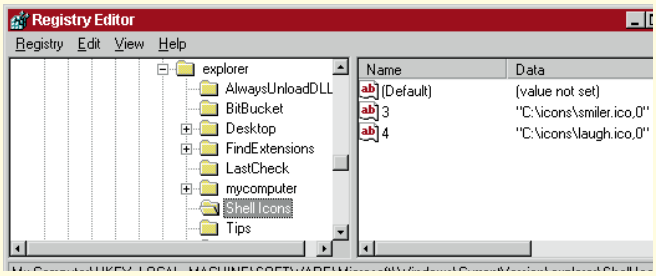
My favourite trick this month comes from Garan Jenkin in Jersey. Once more we're back with icons, but this time there's no registry hacking involved, and this tip makes a rather fine complement to the folder icon trick. You may have noticed that when you stick an Autorun-enabled CD-ROM in the drive, it usually has its own custom drive icon in Explorer or the My Computer folder. You can exploit this capability for other drives by creating a file named AUTORUN.INF in the root of each partition. This file should contain two lines:

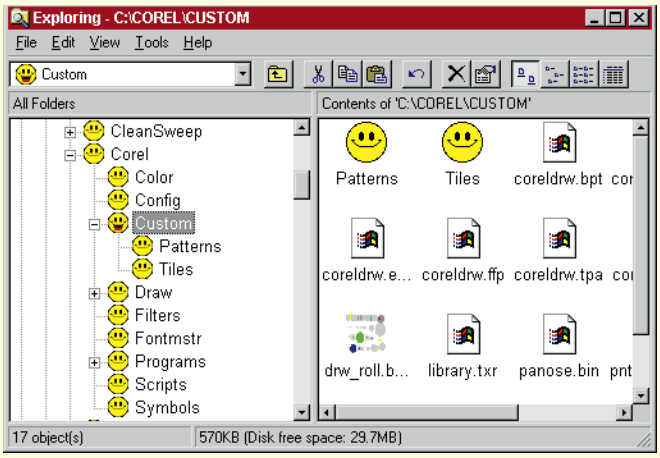
```
[autorun]
icon=filename,number
```

The filename and number conventions are the same as the registry tip above — if you don't specify a number, the first one in the file (number 0) will be used. You can use a different AUTORUN.INF for each partition to get a different icon. I can't get it to work with floppy disks, but you may have more luck.



Autorun those drive icons





Left *Hitting the metal — editing the folder icons in the registry…*

Below, left *…and look — it can be done!*

Value Data field type the filename of the icon in the format filename, number, where filename is the complete path to the icon file — which can be an .ICO, .EXE or .DLL. If the file contains more than one icon, then "number" selects the one you want, starting at zero.

For example, if you want the tree icon in SHELL32.DLL this should read:

```
C:\windows\system\shell32.dll,41
```

This will set the closed folder icon. Repeat with a New String Value named 4 and specify another icon. This will be the open folder icon. Close Regedit, and you'll probably find nothing happens, even if you restart Windows. You need to jump-start the changes, and only Craig Lewin included this information.

While the cat's away...

I've had several reports that Windows starts with the Number Lock off, i.e. the numeric keypad mimics the arrow keys rather than producing numbers, no matter what is set in CONFIG.SYS or the PC BIOS settings. This, it seems, is a problem with the Intellipoint mouse driver. I haven't been able to reproduce this problem myself, but the following, taken from the MS Knowledge Base, may help. You need to add a key named "Keyboard" to the following registry branch:

```
HKEY_CURRENT_USER\Control
Panel\Microsoft Input Devices
```

Add a string value named "NumLock" to the key, and set the string value to "ON". As I mentioned, I can't vouch for this personally, but thanks to Alan Budden for passing it on.

Go to Control Panel Display (or right-click Properties on the Desktop) and pick the Appearance tab. Scroll through the list of items until you see Icon. Change the icon size, click on Apply and you should see the changes take effect. You can then change the icon size back to whatever it was, and click OK. Finally, to get the new Open Folder icon to appear in the title bar of folder windows and on the taskbar, you need to restart Windows.

Your open and closed folder icons should now be permanently changed to the new choice — in theory, at least. I did mine with Microangelo, and Windows changed them back shortly after. I've now redone them by hand, and all seems well. But who can tell what tomorrow may bring?

Robert Parr was less than impressed by my way of getting a directory listing to file using the Send To command and a batch file. He says: *"Instead of using the Send To menu as you describe, how about having 'Contents' as one of the options when you right click on a folder?"* Well, I liked my version because firstly, it didn't involve any Registry editing and secondly, it doesn't add to the top level of the right-mouse menu, which in my case is already rather overcrowded. But I have to admit Robert's method is rather classy, so here it is. As always, make sure you back up the Registry before editing it.

Open the Registry Editor and go to

```
HKEY_CLASSES_ROOT\Directory\shell
```

Add a new key called "contents" into shell, and give it a default value of "&Contents". Next, add a key called "command" into "contents", and give it a default value of "c:\windows\contents.bat %1". Then close Regedit and use Notepad to create the following batch file:

```
@echo off
dir %1% /o > c:\windows\contents.txt
notepad c:\windows\contents.txt
```

Save this in the Windows folder as "contents.bat". Right-clicking on a folder and selecting Contents will now open Notepad and display an alphabetically sorted list of files contained in that folder which can be printed, or preserved by saving under a new name.

If you don't want to edit the Registry, you can do this via the File Types tab of Explorer/View/Options. Scroll down to File Folder, click on Edit, then click New in the next dialogue box. In the following box type "Contents" under Action and "c:\windows\contents.bat %1" under Application Used.

What's in a name?

To return to another long-running saga, Deborah Pate wrote concerning my moan about applications that put their name, rather than the filename, first in the title bar or task bar button: *"Microsoft now recommends that programs should put the filename first in the title bar, and Windows 95 programs like Notepad are well-behaved. I presume Office 95 programs are, too. Unfortunately earlier versions aren't…"* Well, that was my original point — Office 95 programs don't put the filename first, but this shouldn't prove an insurmountable problem for Deborah, who describes the following wonderful piece of hackery.

"It is possible to fix this with the aid of a hex editor. Once you've found the place in the program where the title bar legend is kept, you can simply replace the first character with a null. This means the program name doesn't show in the title bar or taskbar. The difficult (well, tedious) bit is finding the right place in the right file, but here are the ones I've managed to track down:

• Word 6.0: the second occurrence of 'Microsoft Word' in the file WWINTL.DLL.

• Excel 5.0: the seventh occurrence of 'Microsoft Excel' in EXCEL.EXE.

• Corel Draw 5.0: the second occurrence of 'CorelDRAW!' in CORELDRW.EXE."

Far be it from me to encourage such wanton vandalism, which probably breaks the terms of your licence agreement and makes ineradicable stains on your best anorak, but it would be shirking my duty not to investigate this. And besides, it sounded fun. So having backed up everything in sight and checked my life assurance, I tried this with Word 6.0 and Excel 5.0 and it worked a treat. A book token is on its way, Deborah.

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Abort, retry, forget it

DOS gets a look in as Tim Nott passes on some handy tips. Plus, the latest accessories for Windows and a close up on the alt key.

Our embracing of *Hands On DOS* has had a mixed reaction. Hoi Lam, of Hook in Hampshire, says: "*Please don't look back to the DOS commands…*" Ulrich Schneider, on the other hand, writes from Germany to say: "*I am a very keen reader of your contributions to Personal Computer World. I especially like the old DOS — er, sorry, Windows 3.1* — Hands On *section.*" Well, Ulrich, flattery will get you anywhere; so the DOS stuff stays.

Permanent deletion

Ulrich also included three DOS tips, the first of which covers deleting files. As you no doubt already know, deleting a file doesn't remove the data from your hard disk — it just marks the sector available for writing. If nothing has been written to the sector since the deletion, the file can be recovered with the DOS or Windows undelete utility.

But if you truly want to delete a file completely and immediately, Ulrich suggests overwriting it with a series of null characters. The relevant command is:

```
COPY NUL FILENAME.EXT
```

Replace FILENAME.EXT with the name of the file you want to get rid of and use with care.

No more empty messages

Ulrich's second tip is one I've never seen before and seems to be undocumented. If you add the /F switch to the end of the Shell= line in CONFIG.SYS, then DOS behaves in a rather more friendly manner when you try to access an empty floppy disk drive.

If, for example, you type DIR A: from the C: prompt, and there is no disk in the A: drive, you get the "Abort, Retry, Fai"' message. I don't know about you but it always takes me several attempts to abort, fail or whatever and get back to the C: prompt. With the /F switch (which actually is a COMMAND switch that is passed on by SHELL) DOS gets back to the C: prompt automatically. You can return to the old way by starting a new command processor, COMMAND /D.

Finally, for those for whom every second counts, adding SWITCHES=/F to your CONFIG.SYS file shaves two seconds off the delay when the "Starting MS-DOS…" message appears.

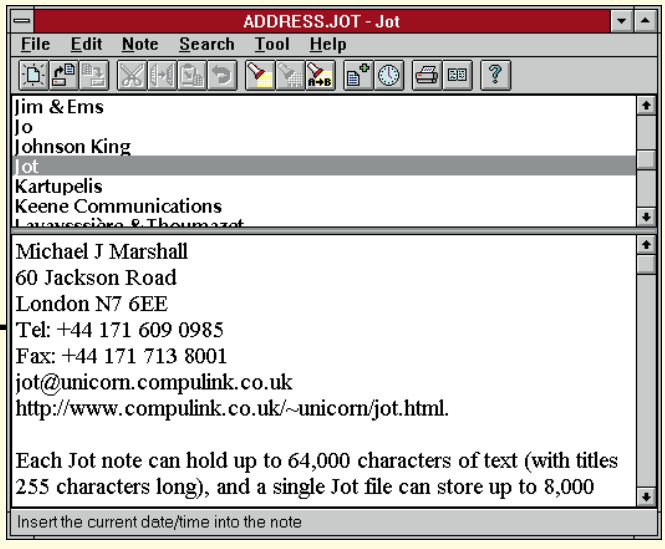
Accessorise

And now to please everyone else, let's get back to Windows. Two version 3.x accessories I continue to use under Windows 95 are Write and Cardfile. I use the former because it is much, much faster than its native Windows 95 counterpart, WordPad, both at loading itself and documents. Rumour has it that Microsoft lost the original source code to Write, which may explain why WordPad is such a dog.

I still use Cardfile for several reasons. The first is sheer laziness. I've had an address book in Cardfile format for more than six years. Since those early Windows 2.11 days, not only has Cardfile remained exactly the same, but I've never found anything that made me want to change. All the personal information managers I've seen, ranging from Organiser to Windows 95 Exchange Address Book, are simply too complicated and too inflexible. Microsoft Schedule, for example, has room for eight phone numbers but no room for an email address.

I like Cardfile because it's quick and easy to copy and paste addresses into other applications, it autodials phone numbers, and if there's too much information to fit on one card, you can open another one with the same title.

This month brought with it two challengers. Both are shareware, both are British and both are available in 16-bit and 32-bit versions. Michael Marshall's Jot 1.2 costs £20 to register. Weighing in at 725Kb in contrast to Cardfile's 91Kb, Jot's first advantage is the size of each record. Each entry can be 64,000 characters long with a



Jot — a simple database for long-playing records

Yet more keyboard tips...

In the June issue, we admired the shine of the Shift key, in July the complexities of the Control key, and this month, in the third and final part of the trilogy, it's time to consider the allure of the Alt key.

1. File Manager
Alt + drag will move, rather than copy, files between drives.

2. File Manager
Alt + Enter summons the Properties dialogue box for the highlighted file or directory.

3. Program Manager
Alt + Enter summons the Properties dialogue box for the highlighted icon or group.

4. Clipboard
Alt + Print Screen copies an image (or screenshot) of the current window to the Clipboard.

5. Write
Select some text in Write, release the mouse button, press Alt, and wherever next you click the mouse, the text will be copied. Hold down Shift, as well, if you want to move rather than copy.

6. All applications
Alt + <letter> opens the menu which has that letter underlined in the menu bar.

7. All applications
Alt + Tab switches to the next window on the desktop. Keep Alt held down and you'll see the title of the next window each time you Tab — release Alt when it's the one you require.

8. All applications
Alt + F4 closes down.

9. All applications
Alt + Spacebar produces the System Menu — equivalent to clicking on the little bar at the left of the Title Bar.

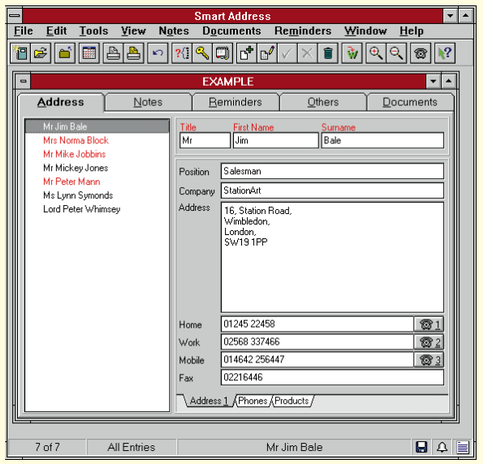
10. Text entry
Alt + <number> returns the character whose ANSI code is <number>. The numbers must be typed from the numeric keypad and start with a zero. For example, Alt + 0169 produces the copyright symbol ©.

255-character index (Cardfile's limits are 400 and 40). It's also got a much smarter interface than Cardfile, with a button bar, a status line, a time stamp and other goodies such as context menus, a choice of fonts, columns and print preview.

It imported my Cardfile database beautifully, but I was less impressed with the navigation. Unlike Cardfile you can't press Control + Shift + W to go to the start of the Ws in the index. In addition, although the search feature handles wildcards and regular expressions, it doesn't wrap. In other words, if you're looking for entries containing the word "Scunthorpe" and you start from the Ps, it will only search from P to Z. Finally, unlike Cardfile, you can't include pictures in a record.

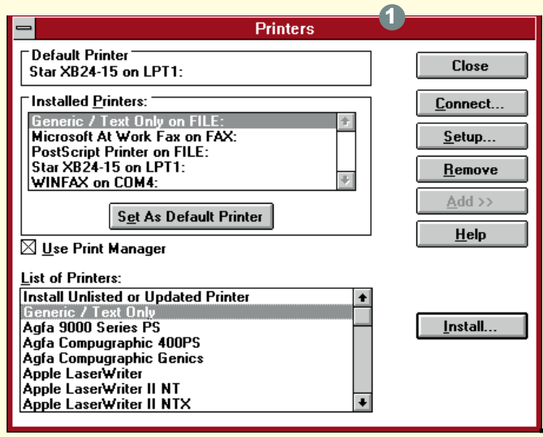
Clever clogs

The second new offering is Oakley Data Services' SmartAddress V3, a hefty 1.6Mb of executable plus a sprinkling of .DLLs which costs £25 (plus VAT) to register. As the title suggests, this is a specific address-book application although it does include a diary and calendar. It bristles with buttons, tabs and features, and includes auto-dialling, call logging, labels and a DTP-like designer. There's so much to SmartAddress that there simply isn't room to describe it all here, so I'll confine myself to its address book facility.



Smart Address — everything you could possibly need

Each record has five tabbed pages. Address is self-evident, as is the free-form Notes. Reminders



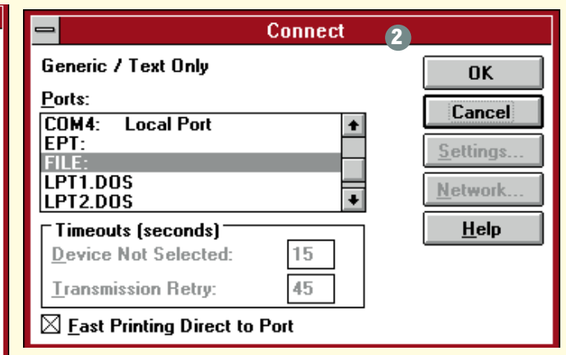


***Fig 1* (left)** *Installing the text-only printer driver…*

***Fig 2* (above)** *…and connecting it to "FILE:"*

links to the diary and calendar, Others contains additional information such as the date when someone last telephoned you, and Documents lets you add OLE links to any other file. This last facility is great — an accountant could have links to clients' spreadsheets, a builder could have links to estimates and so on.

The address page itself can have additional sub-pages, such as those dedicated to home and work addresses. In addition, you could have another page containing a price list, club membership data or list of favourite foods, for example. These extra pages are defined on a per-record basis, so you can mix and match family, friends, suppliers and customers, all with their own custom pages.

There's a neat feature for inserting an address into a variety of word processors. Because the data is separated into fields, I could not import my Cardfile, but apart from that hitch SmartAddress seems to have everything you could possibly wish for — other than the ability to show pictures. Both Jot and SmartAddress are on this month's cover-mounted, CD-ROM, so see what you think.

Latest export

Finally, although we've had this tip before, it's a very useful one and deserves another outing.

If you want to export a Cardfile as a plain text list, then the simplest way to do it is to print it to file. To do this you first need to install the Generic/Text Only printer driver from Control Panel/Printers. Windows will prompt you for an installation disk: when the driver is installed, hit the Connect button in the Printers dialogue box and select FILE:.

There are a few options to play with for sending control codes to the printer, or mapping the extended character set, but these are not relevant to this operation.

Go back to Cardfile, and select Specific Printer — Generic/Text Only on FILE: from File/Print Setup. If you open the Page Setup dialogue box you can change (or get rid of) the header and footer for each page. Then select Print All and you'll be prompted for a file name. And that's it — you'll get a text file, which although rather over-rich in leading spaces and carriage returns, is still readable and editable.

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Serial madness

Chris Bidmead goes pear-shaped, overcoming serial problems while setting up comms drivers on Windows NT. And there's further Ntrigue, too.

My mate Marcus is getting quite fond of Windows NT: he's managing to do really useful things with it at work, setting it up Intranet-wise as the basis of an enterprise-wide information system and earning himself brownie points galore on top of his already enviable salary.

Alas, for me, things have gone so smoothly for him that he hasn't had to get embroiled in the entrails of NT, which is where I seem to be spending too much of my time lately. So he couldn't help me with the serial problem I had, and wasn't even able to calm me down when I got furious about the way NT handles this.

I was trying to set up the comms drivers on the Windows NT server running on the newly-installed NEC Powermate. I'm aiming to connect my network through it to Cix, CompuServe, Global Internet, Netcom, Pipeline and the seeming myriad other Internet service providers who've been offering me trial accounts recently.

Some, like Netcom, give it to you virtually on a plate, with installation from a CD-ROM that sets you up and connects you within minutes. The catch is that most of them assume you're going to be using Windows as your operating system, and at least one of them (Pipeline) won't work with anything else.

Fiendish plan

Rather than hack away trying to get each one working with Unix, my fiendishly simple plan was to install them all on a Windows NT server and ultimately either use that as a router for the rest of my network, or migrate the more useful services to Unix once I was sure they worked well.

One small catch was that I couldn't get the serial port on the NEC Powermate to respond. It turns out that there are better ways of going about the diagnosis than the one I chose, but as a Windows NT beginner the approach seemed logical to me.

So here's what I did. Open the Control Panel and click on Devices. This shows you a list of all the software and/or hardware hoojimaflips on your system, mixed in with a list of hoojimaflips that aren't on your system but which NT knows about.

The ones that aren't present are marked as Disabled and the others show whether they belong to the system, have been automatically started, manually started and so on. (Incidentally, in there I noticed the X11 display Network Interface that this version of NT adds to do its X magic. But more on that in a moment).

In there, is a device called Serial which is marked as automatically started. Select it, hit the Stop button, and a window pops up to tell you that the system is attempting to stop the serial device. After a moment the "Started" status disappears and you assume you've stopped the service.

OK, so now you hit the Start button. The system tells you it's attempting to start the service. About 20 seconds goes by and the word "Started" reappears in the Status column — so at least you know the underlying software service for the serial port is working and can proceed to the next bit of diagnosis. Yes?

No. I discovered that when the Devices module tells you the serial service has been started it may only be kidding. It turns out that my first port of call should have been the Event Viewer, a key utility you'll find grouped under Administrative Tools. There you get the real story. In this case it was a warning, which I quote verbatim: "While validating that COM1: was really a serial port, the contents of the divisor latch register was identical to the interrupt enable and the recieve (*sic*) registers."

As it happens, after 15 years of messing about with RS232 devices, I understand what is going on. But frankly this jargon-ridden grammatical mess of a sentence, with its misspelling of "receive" really doesn't do much to reinforce your confidence in the system's view of itself.

This is followed by the peremptory: "The device is assumed not to be a serial port and will be deleted" — Oh, thanks. Thanks a bunch for not telling me about it and not even telling the poor old Devices module that was cheerfully reporting it had successfully started the service.

When the Unix people, with more than 25 years of their operating system behind them, say that Windows NT is "immature" I guess that this is the kind of thing they mean.

Afterthoughts

Later… Calm down, Bidmead. Firstly, I now realise that the Devices module wasn't lying. It was accurately reporting that the Serial Service was being started and stopped. When it said it was running, it was. Distinguish between the "serial service", which is a software module, and the device itself (which is also a software module behaving as a virtual serial device a bit lower down the chain). The "device" wasn't working and was deleted. The service continued to run. Its decision not to report the disappearance of the device is, I suppose, a matter of taste.

That phrase of mine, about "15 years of messing about with RS232 devices" is somewhat double-edged in the light of what the problem turned out to be. There's a classic joke about an old duffer who claims to have "15 years' experience", to which the retort is, "No. You've got one year's experience. It's just that it's 15 years old."

In my young day, a machine either had a serial port or it didn't. If I'd been paying attention I'd have remembered that about ten years ago manufacturers started introducing serial ports that could be switched on or off by software in the BIOS, to free up interrupts. Yup, the COM1 port was switched off (the plain English translation of "the divisor latch register was identical to the interrupt enable").

NTrigue

My mention of the X Window System in conjunction with Windows NT may have puzzled you if you've just joined the

I've shown multiple system windows under X before but now that I can add Windows NT (thanks to NTrigue) the possibilities are becoming mind-boggling. This is the screen of my NeXT machine, with a window running the 32-bit version of Steve Palmer's AMEOL, with the Caldera desktop represented in a couple of other windows. The minimised Netscape icon you can see in the top lefthand corner also belongs to Caldera

column. I'm running a product called NTrigue — essentially a version of Windows NT version 3.51 that translates the graphical user interface into X so that it can be squirted over the network. This allows you to pop up a Windows NT window (or several) on any machine on the network with an X display. NeXT natively uses Display PostScript instead of X, but a company called Intuitive Systems offers Cub'X, an X server application that integrates into NeXTStep as if to the manner born.

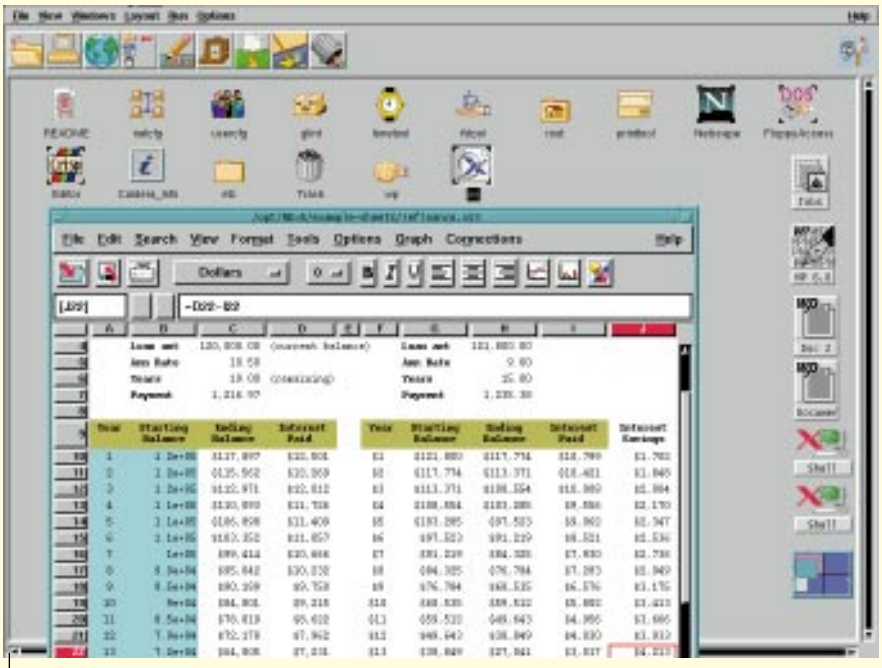
I told you last month that I would get NTrigue version 1.1 installed on the new NEC 100MHz Pentium Powermate in time for this column and for once I've managed to keep a promise, despite silly setbacks like the serial port problem. The installation is identical to a standard Windows NT install except for the process I mentioned last month, of having to run a validation program which provides you with a magic number derived from the machine and the date. You then fax that number to Insignia, which then faxes you back another number that unlocks the software — as long as you key it in before midnight on the same day.

Worrying, this. Picture a financial dealing room at around 11pm when the Tokyo market is getting under way and your 12 dealers all need their NTrigue sessions on their screens. Suddenly, for whatever reason, your NTrigue server crashes and has to be restored from back-up. Do you need to go though the validation routine with Insignia again?

I checked with Insignia, which didn't have an immediate answer to this question. Worst case — what if the system restore has to be done at midnight from the original CD? In that case you'd certainly need to be able to get in touch with Insignia to get a new validation code. Does it run a 24-hour, 7-days a week service? Er… no, it doesn't.

With the main Windows NT engine installed on my NEC Powermate, the next step is to set it up to handle remote sessions. This is done with an extra NTrigue administration utility called WINCFG. You use it to create "WinStations" — individual connections to sessions on the NTrigue server.

NTrigue Winstations all use X11 as the transport mechanism, but can have different characteristics depending on whether you want to use encryption or allow sessions to time-out if left unused for a certain time. Winstations can be created in sets: essentially a collection of identical clone sessions with sequentially numbered names. You don't have to know these names when you log on, they're just automatically allocated.



The latest addition to Caldera is the Internet Office Suite. It comprises WordPerfect 6.0 for UNIX (now under the aegis of Corel), NCD's Z-mail and a spreadsheet (seen here) called NExS. Frankly, I don't think it's going to set the world on fire and without a database it's surely no great bargain at $329. But the Caldera company sees it as the vanguard of a stream of UNIX commercial products that will be ported to Caldera over the coming months

You log on from a remote X system by using the rsh (remote shell) utility which is a standard Unix feature also provided with Windows NT.

Instead of starting up a process in a shell on my own machine, if I enter the command

```
rsh <ProcessName> <YourMachineName>
```

I run the process on your machine. It's not quite that simple, though, as there will usually be some security hurdles to be cleared, but you get the general picture (man rsh will tell you the full story if you're running Linux or something similar). NTrigue uses this command to establish a Winstation connection, and on my system it goes something like this:

```
rsh powermate nextmachine:0 640x480 4
```

where "powermate" is the name of my NTrigue server; nextmachine:0 is the X display I want the session to appear on; and the figures at the end (you've guessed it), define the size in pixels of the display and the colour depth. The size is arbitrary. I've got the habit of creating windows of different sizes depending on the Windows NT applications I'll be running in them.

Not so simple copy and paste

So that's how I get to run Windows NT on my NeXTStep desktop. Necessarily there are some distinct oddities about this, because the cultures of the two operating systems are completely different. But I've got used to this sort of thing from running OS/2 and its built-in WinOS/2 environment. The NTrigue setup costs you an extra machine but in return gives you a full 32-bit version of Windows. And X lets me add Caldera (or whatever) to the mix too.

This set-up saves me walking across the room between the Windows NT machine and the NeXT machine but it's hardly the integrated environment of one's dreams. I'm hoping OpenStep for Windows NT will bring me closer to that in the fullness of time. Meanwhile I have to make the best of X's limited talents at text-only copying and pasting between screens. For graphics, you have to use screen-grabbing.

At first, I couldn't get copy and paste to work. For example, I access the online news service NewsBytes through the Cix conferencing system and connect to Cix using Steve Palmer's AMEOL off-line reader. If there's an item in NewsBytes that I want to save in my NeXT machine's Digital Librarian, I copy it in the NTrigue window and paste it into the NeXT editor. Well, that's the theory. Except that nothing, or something completely different, would appear in the NeXT editor.

The copy and paste features in X can be very baffling if all you're used to is the Windows way of doing things. Essentially, instead of having just one clipboard, there are several. In IBM's implementation of X for OS/2, called PMX, the documentation describes the cut buffer as a stack of eight separate buffers: "By convention, data first goes into CUT_BUFFER0. As each new piece of data is added to the cut buffer, the existing data is moved to CUT_BUFFER1, then CUT_BUFFER2, and so on."

This process is reversed when text is transferred back from the cut buffer stack. The catch is that the stack handling isn't managed centrally by the X server. Each X client is supposed to take care of rotating the data in an orderly fashion, but in practice they tend to do this in different ways.

Just to add some spice to the story, X11 release 3 introduced yet another cut buffer: a special one called PRIMARY. The principle of PRIMARY is that if you've dragged the mouse over some text it's probably because you want to do something with it. So even if you don't bother to do a copy, any text you select automatically turns up in PRIMARY.

In order for NTrigue to be able export the contents of the Windows NT pasteboard, the installation routine puts a special utility called NTutil into the Windows Startup folder. NTutil automatically copies the contents of the Windows clipboard into PRIMARY, which is hardly logical as it can only arrive there after an explicit copy. On the other hand, the Cub'X people have used CUT_BUFFER0 as the transfer buffer between X and NeXTStep. This is a sensible choice because NeXTStep uses copy and paste extensively and, like Windows, doesn't use the PRIMARY style of short cut.

So there's the problem: text copied from NTrigue moves into the X window's PRIMARY buffer, but text copied into NeXTStep is expected to arrive from CUT_BUFFER0. The train turns up on the wrong platform.

My roundabout solution was to start up an X editor under Cub'X (which comes with a full suite of the standard X mini-clients compiled for NeXT). I'd copy from a Windows app running under NTrigue, dump the text into the X editor by clicking the right mouse button, then select the text, copy it, (which gets it into CUT-BUFFER0) and thus be able to get it into NeXTStep. There's got to be a better way, I thought, having done this a couple of times. Happily, there is, but more about this next month, and the new developments on the Caldera front.

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The right **type**

Tim Phillips **reveals the latest development in the world of fonts, eats his words on the subject of grammar checkers, and offers up some tasty macros.**

Although it's tempting, I can't continually keep explaining fonts in this column because real life keeps overtaking me. For instance, this month, (to borrow the style of a newspaper headline): ADOBE AND MICROSOFT IN UNIVERSAL-FONT-FORMAT-PLAN SHOCK.

If you remember, the history of software fonts is one of Adobe coming along and giving us PostScript, which defined the territory for scalable vector fonts: those made up of mathematical formulas rather than dots on a screen. Then Microsoft gave us its own set of vector fonts, called TrueType, which is supplied with Windows and Windows applications. Check your PC and you will probably find at least 30 TrueType fonts.

Poor old PostScript hasn't been too prominent in the PC market recently, although for Mac users (and, by implication, most designers and typographers) PostScript is still the dominant vector font format.

The problem Microsoft and Adobe are trying to solve is how to establish a common font format for the Internet. Web pages have any type style on them at the moment, but to embed fonts in a Web page as you embed them in a word processor document, you need a set of fonts that any operating system can use.

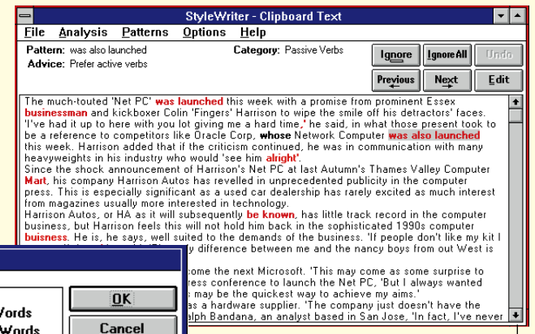
So Microsoft and Adobe plan to merge PostScript and TrueType into a new format, to be called OpenType. To do this the two companies will cross-license each other's technology and make the OpenType format freely available to anyone who has a vested interest, such as other operating system vendors.

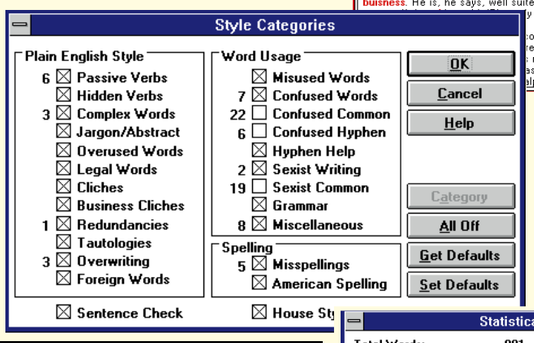
OpenType will be included in all future Windows and Adobe software releases including Acrobat, its portable document software. This paves the way for a common format for embedding fonts in Web documents: miles away from the original aims of the Web, to prioritise content not form. But what the hell, it's one less format to worry about and that's a good thing.

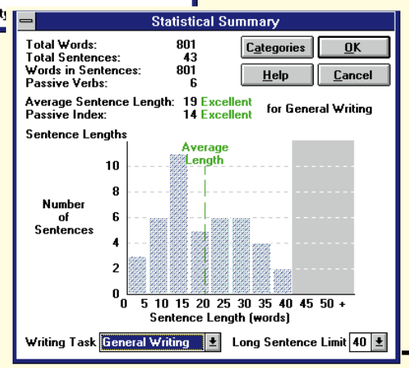
Web publishing

Part 164 of my quest for the best HTML authoring software: Andrew Duke of Southampton University proposes I should use EasyHTML, a shareware application written by... Andrew Duke himself.

He has a point. The problem with the HTML applications supplied by word processor companies is that they never produce true representations of the document you are converting. I may be a bit simple but I, too, have trouble learning them, so I fall back on manual coding.







Above *The general StyleWriter screen, showing clipboard text*

Middle left *Style categories for checking. I may have one tautology, three cases of overwriting and two sexist remarks in my copy — but I put them in on purpose!*

Left *The statistical summary, showing some of the 12 writing categories against which you can test*

Fig 1 Spelling checker toggle

```
'Toggles Autospell and displays setting in status Bar
Sub MAIN
Dim spellvals As ToolsOptionsSpelling
GetCurValues spellvals
If spellvals.AutomaticSpellChecking = 1 Then
        ToolsOptionsSpelling .AutomaticSpellChecking = 0
        Print "Autospelling OFF"
Else
        ToolsOptionsSpelling .AutomaticSpellChecking = 1
        Print "Autospelling ON"
EndIf
End Sub
```


Fig 2 Font display macro

Bob Lauder's short version of a font display macro (the longer version will be on next month's cover-mounted CD-ROM):

```
Sub MAIN
FileNewDefault
StartOfDocument
Dim Fonts$(CountFonts())
For i = 1 To CountFonts()
        Fonts$(i) = Font$(i)
        Font "courier new"
        Insert Fonts$(i)
        InsertPara
        InsertPara
Font Fonts$(i)
        For Alpha = 16 To 255
                Insert Chr$(Alpha)
                Insert Chr$(32)
        Next Alpha
        InsertPara
        InsertPara
Next i
End Sub
```

EasyHTML is semi-automatic. Run it under Windows 3.1 or 95 in 800 x 600 or 1,024 x 768 resolution and you get a tabbed dialogue box, with six formatting categories. You select the formatting you want for the text using check boxes and radio buttons. The style tags are then generated and you paste these into the document, which is open as plain text alongside HTML in your word processor. There are pages to help you format images and links, too, but you don't get a WYSIWYG display. You will learn about style tags though, so the program functions as a tutor as well.

Will I be using it? Well, not at the moment. Although it costs only £10, EasyHTML doesn't support frames or tables, which have to be coded manually. I'm looking forward to version 1.1, but I recommend you try the application out for yourself: download it from http://www.soton.ac.uk/~ajd/easyhtml/.

Tim's macro club

The debate still rages over whether the autospellcheck function is a good or a bad thing. I Reckon it's great, but lots of you hate the wiggly red line that Word puts under letters. *Fig 1* shows a timely macro from Gavin Brock at Imperial College, London. It's a simple function that toggles the spelling checker on and off, and puts a display in the status bar. From the same source we have the beginnings of a cross-word solver. The macro in *Fig 3* (overleaf) uses the word dictionary to find words by entering a wildcard pattern, using ? for single and * for multiple blanks, or as a single word anagram. *"I know its cheating but it helps,"* says Gavin, and he's right.

Bob Lauder has sent a much improved

Hints & Tips

A bumper crop of hints and tips from Alan O'Brien came my way via CompuServe. Here are three of his ideas that I liked:

● **Saving in good order**

To keep track of his documents, Alan has a directory for each month of each year on his hard drive. To make sure his documents save in the right directory, he uses the system date in a macro to automatically allocate them, and another macro automatically saves to another drive for backup.

• Alan is keeping his macros to himself, so prizes for anyone who provides a relevant set (or subset) of the required macros for any popular word processor.

● **Footer fun**

Add the path and filename of the document as a footer. Then the hard copy will show you where the original is kept. In Windows, the field is: `{filename \p\ *Caps}`

● **Over here John… on my header**

Automatic numbering of paragraphs in Word causes problems for many of you — the biggest gripe is that it starts numbering again, at one, after any header. Alan instead defines his own styles, such as "MyHeader", which are used instead. This is a kludge but not a bad one, because when you are making a table of contents from a long document (which you should try; it's excellent) you can ask Word to look for those style tags instead of headers. The real problem is that you can't work from an outline defined in the Outliner.

• I'll be returning to outlining, indexing and generating tables of contents in a couple of months, but before then, I'd welcome any tips from you lot at the sharp end.

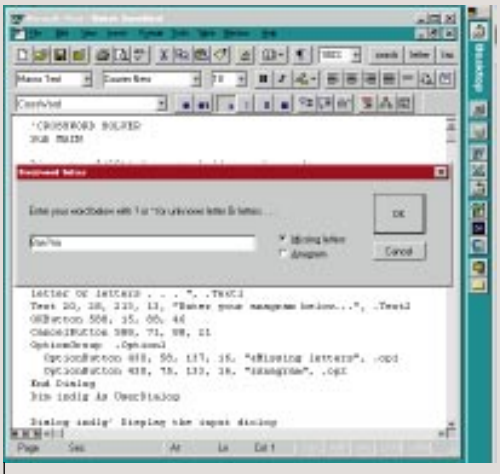
● **A5 booklets for all word processors**

We've received more in the mailbag following Alison Walley's need for a macro to make her documents print in A5 booklets. George Lukic wrote from Dar Es Salaam (yes, really) to tell me of a program called ClickBook, which he got for $20 from BookMaker, 2970 El Camino Real, Palo Alto, California, US. Apparently, the software installs itself as a macro into most Windows word processors. That's all I know, but George swears by it and has no complaints.

• If you want to be happy like George, instead of grumpy like me, I'd suggest you give the company a call. Reports, please.

Fig 3 Crossword solver

```
'CROSSWORD SOLVER
Sub MAIN
Dim outarr$(20)' Array to hold search results
On Error Goto Stopnow' In-elegant but efficient way to quit
While (1)' Infinite loop
' Define the input dialog box
Begin Dialog UserDialog 712, 120, "Crossword Solver", .getword
TextBox 20, 63, 374, 18, .TextBox
Text 20, 28, 483, 13, "Enter your word below with ? or * for unknown letter Or letters . . . ", .Text1
Text 20, 28, 213, 13, "Enter your anagram below...", .Text2
OKButton 588, 15, 88, 46
CancelButton 588, 71, 88, 21
OptionGroup  .Option1
  OptionButton 430, 58, 137, 16, "&Missing letters", .op1
  OptionButton 430, 75, 133, 16, "&Anagram", .op2
End Dialog
Dim indlg As UserDialog
Dialog indlg' Display the input diolog
Redim outarr$(20)' clear output array
n = ToolsGetSpelling(outarr$(), indlg.Textbox,,, indlg.option1 + 1)
If (n > 0) Then' If any words found
        Begin Dialog UserDialog 294, 302, "Results"
        ListBox 10, 6, 179, 290, outarr$(), .ListBox1
        OKButton 195, 7, 88, 287
        End Dialog
        Dim outdlg As UserDialog
        Dialog(outdlg)'Display results
EndIf
Wend
Stopnow:' Ends the macro
End Sub
Function getword(identifier$, action, suppvalue)' Dialog function
        Select Case action
        Case 1   'The dialog box is displayed
                DlgFocus "TextBox"' focus on the input box
                DlgVisible "Text2", 0' Default to missing letters
        Case 2   'The user selects a button
                If (identifier$ = "op1") Or (identifier$ = "op2") Then
                        DlgVisible "Text1", suppvalue - 1
                        DlgVisible "Text2", suppvalue
                        DlgFocus "TextBox"
                EndIf
        Case 3   'Text change (not applicable)
        Case Else
        End Select
        End Function
```



*The crossword solver: ? for one blank; * for more than one blank. It finds the possibles from the Word dictionary and has reduced my best time from years to weeks*

version of last month's font display routine which will be included on next month's cover-mounted CD-ROM. It's a long macro, but worthwhile. It prints a selection of each font in a box with its name next door. The output is as good a reference sheet as you need. In addition to the long macro, Bob also sent a shorter version, shown in *Fig 2* on the previous page.

Mind your language

Not all of you agree with me that grammar checkers are a waste of time, including Editor Software, which sent me the latest version of StyleWriter. I remember this souped-up grammar checker from the bad old days when I was a cub reporter. The company I worked for suggested sacking all the people who check the features and buying a copy of this package to replace them. I disagreed but StyleWriter won and I was looking for another job.

So when Editor Software called suggesting I review StyleWriter, I was looking for my revenge. I have to admit, however, that it's quite good. StyleWriter goes beyond the bounds of usual grammar checkers and judges how appropriate your style is to certain templates, such as business writing, copywriting, memos and so on. It does this by the rough-and-ready method of counting the words in sentences, the average length of words and the proportion of passive phrases. It also checks your copy according to a standard set of grammar rules.

This version of StyleWriter has some decent Windows connectivity. It will automatically pick up features when installed alongside Word (2 or 6), Ami Pro or WordPerfect (5 or 6), or it will check text on the clipboard. It's a trim little application, weighing in at only 1Mb, and it's fast, too. So even if it doesn't do a great deal, it's an improvement on the grammar checkers provided with many applications. If you are committed to using your computer to improve your prose, it's money well-spent. But don't sack your staff because of it. This is not artificial intelligence by any stretch of the imagination.

PCW Contacts

Contact **Tim Phillips** by surface or airmail to *PCW*, otherwise email him at his new CIS address **CompuServe 104047,2750** or **wong@cix.compulink.co.uk**

Making a **date**

Supplying a pensions provider with precise dates to retirement is trickier than it sounds. Stephen Wells cogitates possible spreadsheet solutions.

It is singularly unfortunate that the world wobbles about in its path around the sun. Life would be much simpler for many spreadsheet users if there were a constant number of days in a month and a year.

Take the case of pensions consultant Richard Jones of Forest Hill. As I understand it, when a client of his wants to sensibly prepare for old age, R.J. has to calculate how long they have to wait for their gold watch.

Other clients have been paying premiums since bath-water was heated in kettles and similarly he has to advise the insurance company as to what he thinks they are now entitled. Richard gathers his data in Access, then for calculations transfers it to Excel 5.

Over at the insurance company, these matters are in the hands of the actuaries — people who practice a strange art not far removed from astrology. They use historic tables based on algorithms.

Whether looking backwards or forwards, when defining the life of a pension Richard has to supply the companies with the number of years and the precise number of calendar months between two dates. This is trickier than it sounds: for a period ending on 30th April or September for instance, the company would count April and September as months. But a period ending on 30th May or July wouldn't count May or July. A calendar year ending on 30th December is only 11 months to them. Not that there is anything unfair in this. As long everybody is subject to exactly the same rules then it's "perfectly equitable, Henry".

Fig 1 *The pension programme as presented. The actual years and months of the period are calculated using an intermediary step*

	A	B	C	D	E	F
1	START DATE	END DATE	TEMP YEARS	TEMP MONTHS	ACTUAL YEARS	ACTUAL MONTHS
2	1-Mar-82	20-May-96	14	2	14	2
3	1-Sep-23	1-Jan-97	74	-8	73	4
4	6-Jan-35	13-Apr-96	61	3	61	3
5	30-Sep-46	7-Jan-96	50	-8	49	3
6	1-Sep-49	1-Jul-99	50	-2	49	10
7						

Richard's solution is shown in *Fig 1*. Column A shows the start date of the pension programmes and column B the end date. The range A2:A6 is named START_DATE, and the range B2:B6 is named END_DATE.

Columns C and D are initial temporary calculations.

```
C2 to C6 has =YEAR(END_DATE)-
YEAR(START_DATE)
```

and

```
D2:D6 has =MONTH(END_DATE)-
MONTH(START_DATE)
```

In Row 2, C2 and D2 hold the right answer. But in Row 3, where the period starts in a September and ends in a January, D3 is wrong because it shows minus eight months.

So Richard has named the range C2:C6 TEMP_YEARS and the range D2:D6, TEMP_MONTHS and pressed on to solve the problem with some complicated IF and AND function formulas (see *Fig 3*). Trying to focus on that is too much for me, but I'll take his word for it that the answers in Columns E and F are actuality for the actuaries.

I've talked to Richard on the phone and he obviously is not sending this in as a solution to share but almost a moan that Excel doesn't offer a simple way of doing this.

• *There is a book token in this for anyone who can find a shorter solution.*

I've come up with three ways of doing it but none of them offer exactly the same answer for every date combination.

Fig 2 *Three new ways of solving the pension programme problem. But will the actuaries be happy?*

	A	B	C	D	E	F	G
1	STARTS	ENDS	PERIOD	YEARS	MONTHS	YEARS	MONTHS
2	1-Mar-82	20-May-96	14 years 3 months	14	3	14	3
3	1-Sep-23	1-Jan-97	73 years 5 months	73	5	73	5
4	6-Jan-35	13-Apr-96	61 years 4 months	61	4	61	4
5	30-Sep-46	7-Jan-96	49 years 4 months	49	4	49	4
6	1-Sep-49	1-Jul-99	49 years 10 months	50	10	50	10
7							

Fig 3 Complicated function formulas

```
E2 to E6 is
=IF(MONTH(END_DATE)<MONTH(START_DATE),
TEMP_YEARS-1,IF(AND(MONTH(END_DATE)=MONTH(START_DATE),
DAY(END_DATE)<DAY(START_DATE)),TEMP_YEARS-1,TEMP_YEARS))

F2 to F6 is
=IF(AND(MONTH(END_DATE)<MONTH(START_DATE),
DAY(END_DATE)=DAY(START_DATE)),TEMP_MONTHS+12,
IF(AND(MONTH(END_DATE)=MONTH(START_DATE),
DAY(END_DATE)<DAY(START_DATE)),TEMP_MONTHS+11,
IF(AND(MONTH(END_DATE)>MONTH(START_DATE),
DAY(END_DATE)<DAY(START_DATE)),
TEMP_MONTHS-1,IF(AND(MONTH(END_DATE)<MONTH(START_DATE),
DAY(END_DATE)<DAY(START_DATE)),TEMP_MONTHS+11,TEMP_MONTHS))))
```


Fig 4 The numbers you've entered

	B	C	D
1	1998	1997	1996

	E	F	G	H	I	J
1	1995	1994	1993	1992	1991	1990
2	£393,233	£311,878	£453,987	£292,111	£323,876	£234,567

Fig 2 uses the same dates as in Richard's example. My first solution is simply to use formatting. Column A is named STARTS and Column B is named ENDS. Column C is simply =ENDS-STARTS. But the column has this custom format: yy "years" m "months"

Excel stores the answer to the subtraction formula as a date serial number. The years in that number are displayed by the yy in the format definition (followed by any label you like — I've used "years"), and the months are displayed by the m in the format definition (followed here by "months").

I would maintain that this is the "correct" answer. But if the insurance companies are not satisfied by anything less than complete calendar months, they're going to have to take a month off in most cases.

Column D uses the YEARFRAC function. It returns the fraction of the year which represents the number of days between a start date and an end date. So cell D2 has =YEARFRAC(A2,B2).

If you can't find this function listed, you probably don't have the Analysis ToolPak installed. You'll find this useful macro on your original Excel installation disks or CD.

E2 has the formula:

```
=(PERIOD/30.416666667)-INT(D2)*12
```

I've named the block C2:C6 PERIOD. So in E2, cell C2 is divided by the average number of days in a month and from this is deducted the integer of the number of years in cell D2, multiplied by 12.

F2 uses the CONVERT function which converts a number from one unit to another. The formula is:

```
=CONVERT(C2,"day","yr")
```

All it does is convert the number of days in C2 to whole years.

G2 works like E2 and is

```
=(PERIOD/30.416666667)-INT(F2)*12
```

I look forward to receiving readers' solutions to this problem.

Future perfect

Past is prologue, said The Bard in The Tempest, and once you've collected a lot of data on a spreadsheet it can be very tempting to project future results from it.

Whether this extensibility is plausible is a determination which can only be made by somebody skilled in the pertinent profession or industry. But if it is, then I can suggest the functions to use.

If all you need is a chart and you have Excel 7, then you can project data lines automatically with a few mouse clicks.

As an example, let's use some annual sales figures for a product. In 1990 the total was £234,567. Sales go up and down and were £393,233 in 1995. We'll put the years in row 1 (formatted as a custom Date, yyyy), with the most recent year to the left, and the amounts in row 2.

If you feel it's reasonable to project from these figures for three years in the future, then insert three columns with the years labelled in B1:D1 and blank cells in B2:D2.

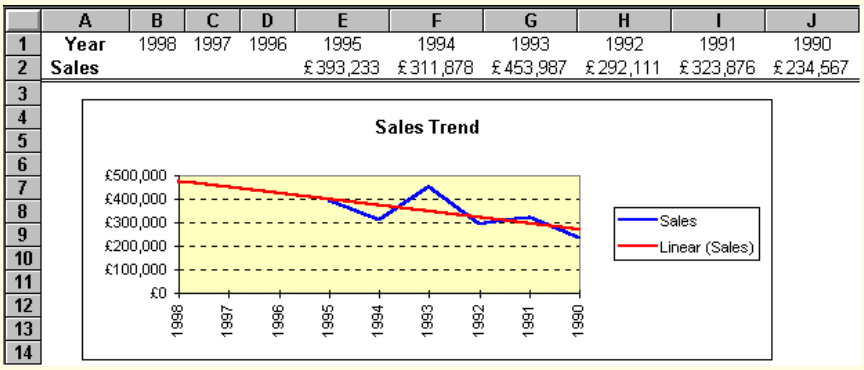
Now select the complete block (in our example this is A1:J2) and click the Chart Wizard button. Pick a Line chart in Step 2, and Type 4 in Step 3; Data Series in Rows, in Step 4; and add a chart title in Step 5.

Select the resultant drawn line and then click the right mouse button. This will now offer a changed list of options. Select

Stuffed dates

As a pensions consultant, Richard Jones' life isn't made any easier by two other Excel idiosyncrasies. If you enter a date prior to 1/1/20 Excel will add a century. In other words, if you enter 31/12/19 Excel initially assumes you mean 31/12/2019, not 31/12/1919. At least you can correct this on the edit line. But the other problem requires a bigger work-around. Excel only recognises dates between Jan. 1st. 1900 and Dec. 31st. 2078. It stores them as the equivalent serial date numbers 1 to 65380.

I'm not going to live to 2078 myself but somebody born this year quite likely will and Richard could well be asked to think about lifetime financial investment plans for them. Fortunately VBA (Visual Basic for applications) for Excel 7 recognises date values from Jan. 1st 100 (which was before Hadrian started his wall) to Dec. 31st. 9999 (when the Chunnel debt will have been paid off). So Richard could put all his dates in a macro.



	A	B	C	D	E	F	G	H	I	J
1	Year	1998	1997	1996	1995	1994	1993	1992	1991	1990
2	Sales				£393,233	£311,878	£453,987	£292,111	£323,876	£234,567

Fig 5 *Excel looks at six years' sales results and projects the trend for a further three years*

Trendline, Linear. (There are also five other types: Logarithmic, Polynomial, Power, Exponential and Moving Average). You can now double-click on any item (the axis labels, lines, plot area, and so on) and change colours or weights to suit. You'll now have a chart as shown in *Fig 5*.

This gives you the big picture but it doesn't tell you exactly what the projected sales are for '96 to '98. You can see from the chart that all three years are expected to have sales of the product between £400,000 and £500,000; and '97 looks like it will repeat the peak of '93. Of course, Excel knows what the numbers are because it has used the TREND function to calculate them. You can, too. The numbers you've entered so far are shown in *Fig 4*.

The TREND function has the syntax (Known y's, Known x's, New x's). Referring to the chart, it's the sales amounts which rise up the vertical or y scale, and the years which are along the horizontal or x scale. So the known y's are in the range E2:J2 and the known x's are in the range E1:J1. The new x's (1996, 1997, 1998) are in cells D1, C1, B1.

Understanding this, we can now enter in cell D2 the completed function:

```
=TREND(E2:J2,E1:J1,D1).
```

Similarly,

```
=TREND(E2:J2,E1:J1,C1)
```

goes in cell C2 and

```
=TREND(E2:J2,E1:J1,B1)
```

is entered in B2.

This produces the exact figures and confirms our rough guesses:

	B	C	D
1	1998	1997	1996
2	£479,643	£453,321	£426,926

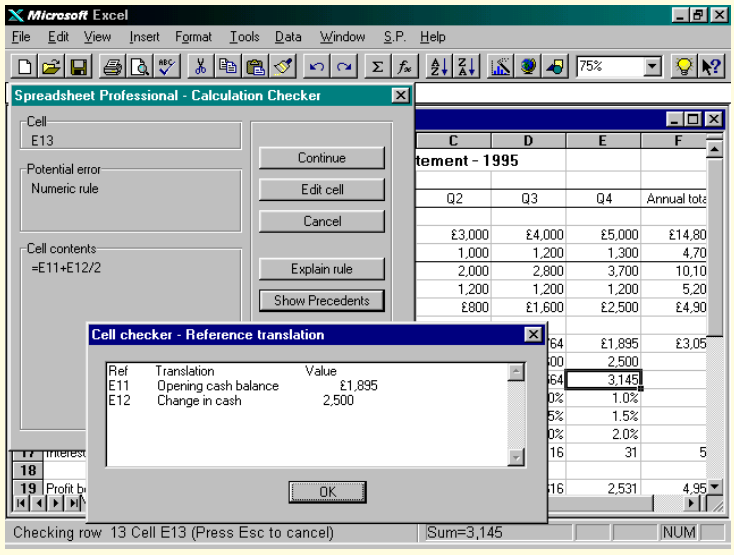


Fig 6 *Spreadsheet Professional is an add-in for Excel or Lotus 1-2-3 which checks worksheets for potential errors*

TREND is probably the most useful function in this area, to business people, but readers with scientific or statistical problems to solve might also use some of Excel's related built-in formulas.

The LINEST function also calculates a line but provides the parameters of the line instead of one or more y values. The GROWTH function creates an exponential curve instead of a straight line. And the LOGEST function provides the parameters of an exponential trend. In other words, LOGEST is to GROWTH what LINEST is to TREND.

Having a check-up

I have come across a spreadsheet add-in, called Spreadsheet Professional, designed to test worksheets and document the results. I looked at Version 2.07 for Excel 7 but there are variations available for Excel 5 and any version of Lotus 1-2-3 which produces .wk3 files.

It is easy to install and adds a new "S.P." option to the menu bar. Once the worksheet(s) you wish to check have been loaded, you click on the additional menu item and are offered a new drop-down menu with all the program's tools.

The first is the Calculation Checker, *Fig 6*. If you start at cell A1, the Checker will go through the sheet, stopping at each "potential error". This doesn't mean there's necessarily an error in a formula. It could be a harmless matter, or a number in a formula which was a quick-fix that wasn't corrected later. When the suspicious cell is pointed out, a dialogue box offers several buttons including a Show Precedents option which displays the Reference Translation box (also *Fig 6*). Another button in the Calculation Checker offers a full explanation of the rule being contravened. A third lets you look at all the rules and choose which ones to ignore.

The second main menu option is a toggle to enable or disable the Cell Translator. Another major tool is the Documentation Generator which offers you a huge variety of ways of testing your range, worksheet or workbook and producing a comprehensive report and full explanation of the audit.

Finally, another tool lets you make a comparison between two worksheets. This can be very useful when you're developing a worksheet and want to check on the differences between various versions.

Compared with the cost of Excel, the price of £295 (plus VAT) for a single user copy seems a bit steep, but Spreadsheet Innovations is not selling to chaps like me but to institutions which have massive spreadsheets and short development deadlines.

PCW Contacts

Stephen Wells welcomes comments on spreadsheets, and solutions to be shared, via *PCW* Editorial at the usual address or **Stephen_Wells@msn.com**. Files can be attached if you're on MSN.

Spreadsheet Innovations
0171 424 0101; email 73064.3550@compuserve.com

Back to **normality**

The mighty meter problem is finished off once and for all as Mark Whitehorn covers normalisation of the original table and the fastest SQL solution.

Over the last two issues, we have looked at SQL (having started with the fundamental operators which underly the language). To my delight, the Editor has decided that SQL warrants wider coverage. So, next month, we will begin a separate three-part series on the subject, as a feature elsewhere in *PCW*.

This gives us more room in the column to look at other issues, which is handy because I want to finish off the continuing "meter problem" once and for all, (see the letter from Phil Bowles, below).

Meter for measure

I will briefly recap for the benefit of non-regular readers. In the March issue I posed a problem which my colleague, Stephen, had encountered in real life. It involved a table of readings from electricity meters; see the screenshot, *Table 1*. The primary key, in this case is made from [Meter No] and [Date].

The problem was that the people who produced the data also wanted to see it as shown in the screenshot, *Table 2*. This table shows data from two records in the same row and the apparently simple question was, how can you produce a table like that shown in the screenshot *Fig 1* from *Table 1* without offending the relational model?

Stephen and I found a workable way of deriving the second table from the first, but as our solution offended the relational model, I asked in this column if anyone knew of a solution which didn't cause such offense. I was grateful to be inundated by replies, several of which were published in the May issue.

However, two further points arose. One was normalisation. One respondent (as discussed in the June issue), suggested that the table I had originally used was not normalised and that this was part of the problem. He suggested the screenshot, *Table 2*, as an alternative. The primary key in this table is Reading No.

So, in the June issue I asked readers: which one do you think is flawed in terms of the relation model, and why?; to what update and delete anomalies does the flawed one lead?; which one will be faster when queried?; and what are the implications of using each table in a real database? The other issue was one of speed. Several people wanted to know; of the SQL solutions presented, which was the fastest?

In this issue we'll look at both of these areas, since both are relevant to more than merely the original question.

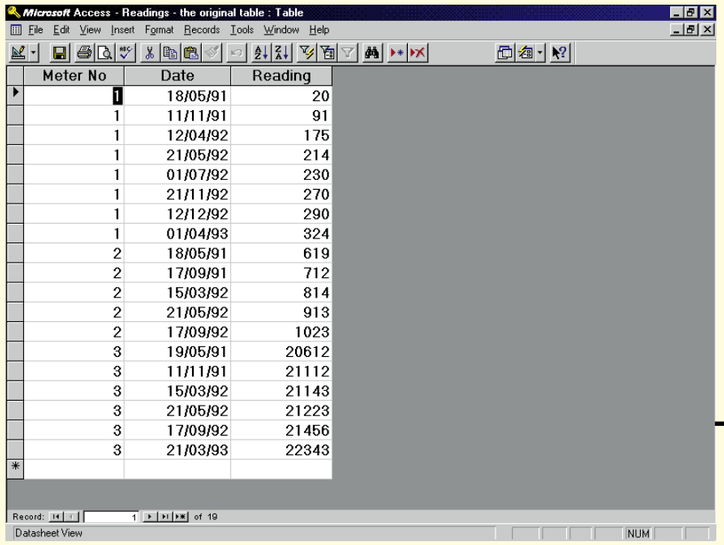


Table 1 *The primary key is compounded from Meter No. and Date*

Normalisation and data redundancy

By far the majority of readers who replied felt that Table 1 was properly normalised, as did Chris Date… yes, *the same*; the other half of "Codd and Date".

Regular readers will remember, that in the June issue a certain respondent suggested that I should "…go away and re-read Codd". Happily, I found I could do better than that because it was very

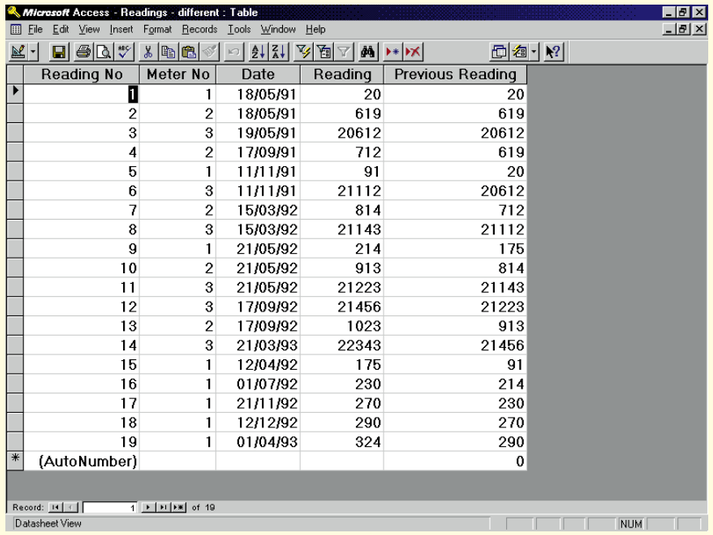


Table 2
The primary key is the "Reading No."

shortly afterwards that I met up with Chris Date. I couldn't resist showing him the tables and asking his opinion. In fact, we discussed three tables, the third being one where each record contains a pointer to the "previous" reading; as in the screenshot, *Table 3*.

Chris gave the following opinion: "We can ask ourselves 'what is the effect of normalisation?' Well, basically, it's to reduce redundancy but in order to consider that question carefully we have to have a careful definition of what redundancy is, and without getting into such a refined definition (because I don't think I could give you one), I will simply point out that normalisation *per se* does not, in general, eliminate all redundancy.

"Here's a classical example" (he indicated Table 2). "This is in third normal form and yet there is clear redundancy. What normalisation does (normalisation to the ultimate normal form) is to get you to a position that guarantees that you will not have any update anomalies that can be removed by taking projections. It doesn't say it'll get rid of all anomalies, it just gets rid of those anomalies which can be removed by taking projections.

So yes, you can have redundancy, and normalisation doesn't help. In fact, normalisation is the one tiny piece of science we have but it is not enough — there are all kinds of other questions — is this" (Table 2) "a good design or a bad design? — I don't know because it is subjective, there is no science there. The only sort of working definition of redundancy you can have is if, somehow, you can make something smaller: then you have redundancy. My gut feeling is that it's a bad design, but I can't quantify or qualify that really."

I think the information Chris gives here is well worth stressing, if only because several books that I have on database design get this wrong. Normalisation doesn't guarantee to remove all redundancy,it only removes that which can be removed by projection. Therefore, you can normalise a set of tables and still have redundancy and, hence, update anomalies lurking in the tables.

So, to answer my own questions: which is flawed in terms of the relation model? All three are in third normal form, but Table 2 contains redundant data, and both Tables 2 & 3 can suffer from update anomalies (see below). To what update and delete anomalies does the flawed one lead? Tables 2 & 3 have potential update and delete anomalies.

For example, consider Table 3. Suppose that we discover that meter no.1 was also read on 01/02/93 and yielded a reading of 300. We can add a record like this:

Reading no.*	Meter no.	Date	Reading	Prevs readg no.
15	1	12/04/92	175	5
16	1	01/07/92	230	9
17	1	21/11/92	270	16
18	1	12/12/92	290	17
19	1	01/04/93	324	18
20	1	01/02/93	300	18

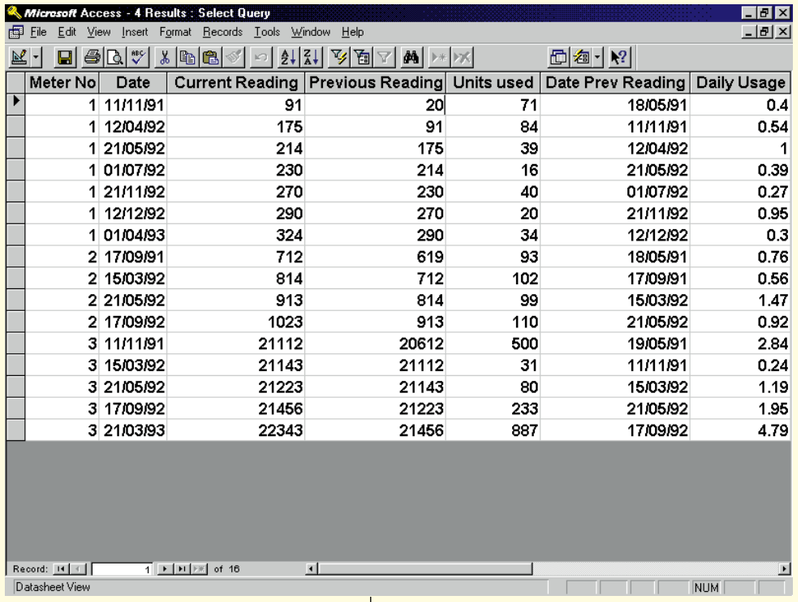


Fig 1 *The way in which the users want to see the data*

The fact that the row is "out of sequence" (at least, in terms of dates) is of no consequence. However, the addition of record 20 has rendered the pointer in record 19 incorrect (it now points to the wrong record). So unless we locate the errant record and correct it, the table now has an internal inconsistency.

In a nutshell this is what is wrong with this type of table design (in my view). Simple changes — updates, and by the same token, deletions — to, or of, one record can cause anomalies in other records. To ensure internal data integrity, some or all of the table has to be checked for integrity after every update. This is clearly not impossible to do but does makes extra work for the developer and may well slow down the database, particularly in a multi-user environment.

In addition, even if the developer's work is perfect, later maintenance work on the database may unknowingly circumvent the checks and lead to a loss of integrity.

Incidentally, the same generic problem exists with Table 2:

Reading No.*	Meter No.	Date	Reading	Prevs. Readg.
15	1	12/04/92	175	91
16	1	01/07/92	230	214
17	1	21/11/92	270	230
18	1	12/12/92	290	270
19	1	01/04/93	324	290
20	1	01/02/93	300	290

Which one will be faster when queried? It is clear that Table 2 will be the fastest for queries like the one desired by the people who wanted the original table. However, if the necessary checking is performed after updates, it will be slower to update.

What are the implications of using each table in a real database? To summarise, Table 1 makes the maintenance of data integrity much easier: queries run against Tables 2 and 3 should run queries more rapidly.

My feeling is that I would rarely implement a base table like 2 or 3, and most readers agreed, although many, like correspondent Phil Bowles, gave an impressively balanced view:

"It may well be that with all those things considered, his choice of solution is a shooting offence. Who can tell? Personally, I try to adhere to a clean design at the outset as experience shows me that it prevents major problems in the future and I'm clever enough to cope with complicated SQL — so I'd go with you. But then again, if I had a team of trainee programmers who were SQL-illiterate, I might consciously make the compromise, adulterate the design and simplify the SQL to reduce development problems.

Its all so complicated, isn't it? These are the reasons that I am no longer an IT professional — at the end of the day, who cares? This type of 'holy war' is one of the reasons why I left IT to become a police officer. If there's going to be a row, let it be over something that matters."

Be warned, he closed his email with *"So my final answer is: I don't care who is right or wrong but if you don't stop arguing right now, someone's going to get nicked."*

…OK, guv', fair enough.

The truth is, of course, that both of these table designs have advantages. The good news is that with a bit of extra work we should be able to have our speed *and* our data integrity.

Suppose we store the data in Table 1, and use that table for all data entry, updates and deletes. Suppose also that, every night, we run a background process that generates Table 2 from Table 1 and writes it to disk. We can then run the user queries against Table 2, and they will run like greased lightning.

Certainly there are disadvantages. The queries that we run under this regime have the potential to yield answers which are a maximum of one day out of date. So we might run the update of Table 2 twice a day, or three times a day — the important point is to discuss it with the users and discover what are acceptable limits. We can even offer them two alternatives: fast queries (run against Table 2) where the data might be slightly out of date; or slower ones (which run against Table 1) which are guaranteed to be up to date. In essence, what I am suggesting is a very simple form of data warehousing. It combines the best of both worlds, which is why it has become so popular recently. Trendy isn't necessarily bad.

Speed

It is worth stressing that in the original question all those months ago, I didn't ask for a *rapid* solution. I never mentioned speed at all, I asked for elegance, academic purity, relational correctness, whatever you want to call it, but not speed. So, while some of the original replies turn out to be slow, this in no way reflects badly upon either the "worth" of the original reply or the worth of the people who supplied them.

However, you asked for the relative speeds so here they are. I looked at three solutions. The first (labelled 4-Stage SQL) is the original one that Stephen and I concocted. It's crude, it's messy, it offends the relational model, but it works. The second is a two stage solution which used two SQL statements and the third is a single SQL solution. (Both of these solutions were featured in the May issue).

Times to complete the queries are given in seconds.

Number of Records	Four-stage SQL	Two-stage SQL	Single SQL
100	2	3	18
200	3	6	79
400	4	18	395
1000	5	117	*
2000	8	553	
20000	58		

*(After 2,700 seconds, the completion bar for the query was showing one percent. I know those bars are notoriously inaccurate but even so I thought the point had been made that it was very slow. I stopped the test because I needed the PC for something else).

Now see *Fig 2*; the obvious implication from these results is that the original, rather offensive, solution, happens to be very fast. The single stage SQL, while interesting, is very slow, even compared to the two-stage one. However there is a more fundamental difference. It is clear (if we invert the figures) that the efficiency of the "pure" solutions, in terms of the number of records processed per second, drops as the size of the table increases.

Number of records processed per second

Number of Records	Four-stage SQL	Two-stage SQL	Single SQL
100	50	33	6
200	67	33	3
400	100	22	1
1000	200	8	*
2000	250	4	
20000	345		

By contrast, the efficiency of the original method measured in these terms, actually increases. I must admit, that this answer surprised me initially, because I expected the set operations to be inherently faster. However, a little thought suggested an answer.

The original method still uses set operations — they are only "impure" in terms of the relational model. The great advantage for this method is that it simply has to manipulate tables of the same size as the test data. The problem for both of the "pure" solutions is that they involve self-joins. These in turn are generating huge intermediate tables which are presumably increasing in size by something like the square of the number of records. I suspect it is this that is gluing up the processing.

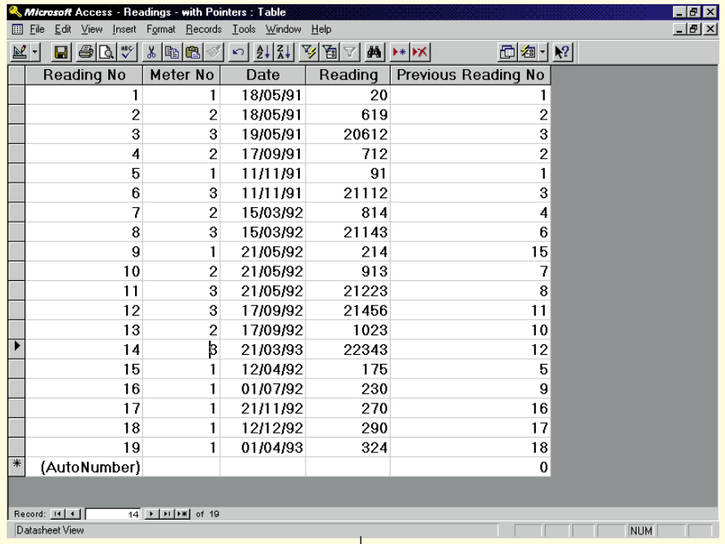
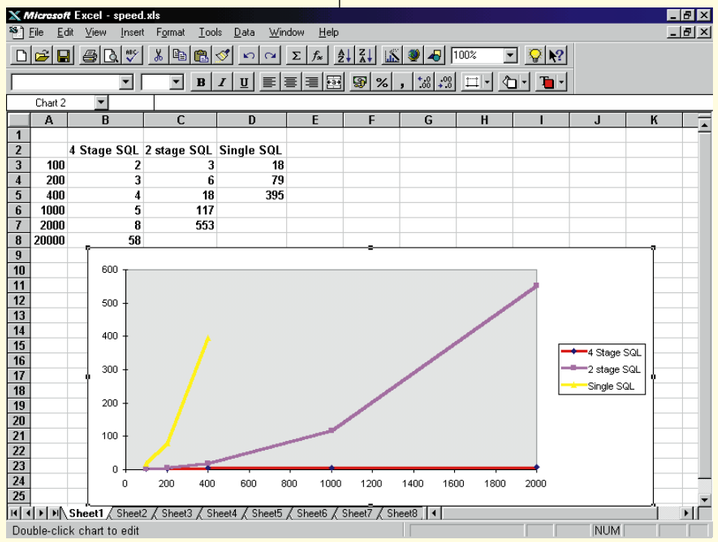


Table 3 *An alternative to Table 2, which essentially uses pointers rather than the data from the previous record*

Fig 2 *The results of the speed tests*



For those who still maintain an interest, and wish to speed test their own solutions, I have included an MDB file, on our cover-mounted CD-ROM, which is the testing database that I used. It is crude and essentially undocumented, because I developed it for my own use. Nevertheless, I suspect that readers who are competent enough to try their own SQL solutions will be able to drive it.

There is a form, with associated code, which will generate the test data for you. If you can find a really fast, yet still pure, solution let me know — but please, only if it is significantly faster!

● *For more about SQL, see the new feature series starting in next month's issue.*

PCW Contacts

Mark Whitehorn welcomes readers' correspondence and ideas for the Databases column. He's on **m.whitehorn@dundee.ac.uk**

Add a **dob of DAPIE**

Terence Green **considers Merlin, destined to include DAPIE which will allow cross-platform compatibility between OS/2 and Windows. There's good news from Lotus, too.**

I recently listened in on a conversation between a research scientist and a journalist when the scientist explained why Windows 95 was better than OS/2 Warp.

"Just right-click on a Warp WorkPlace Shell object," said the scientist "and the menu offers the choices, 'Create Another' and 'Copy'. One creates a new object with default settings, the other makes a duplicate. But the user can't discern the difference!"

My colleague pointed out that by contrast with Windows 95 one had to press 'Start' in order to stop. The scientist hooted: "A detail! They misnamed it!"

On the surface, this seems to be a simple case of seeing what one wants to see; which was my first impression. On reflection, however, the scientist may well have been saying that the WorkPlace Shell (WPS) is over-engineered for the purposes of the average user — and that's a valid viewpoint. The WPS is a superior interface, built using DSOM (IBM's Distributed System Object Model) object technology which allows applications to interact with the WPS both locally and across networks.

But superior technology is worthless unless it provides a genuine benefit to the user. General business applications which exploit Warp and the WPS are rare because IBM's courting of the developer community has been erratic to say the least. The OS/2 flip-flop between home users and corporate users in 1995, when IBM suddenly figured that corporate users would be deterred by the thought of Warp as a home-user OS, didn't help either. These things are usually political so it's a good sign that IBM has come up with a form of words that covers the waterfront. OS/2 Warp is for "the connected user", so that's all sorted now.

Good news

In the next issue I'll provide a run-down on a bunch of new and updated Warp applications, but for now the good news is that Lotus has finally started to wrap up a new version of it's applications suite which will be called SmartSuite 96 for OS/2. If all goes to plan, SmartSuite will demonstrate to developers how it is possible to develop for Win32 and OS/2 simultaneously.

There's a sizeable OS/2 user-base around the world and we're getting tired of waiting for decent, native, OS/2 applications.

All of the Lotus SmartSuite 96 for OS/2 pieces won't be ready until later this year but WordPro 96 for OS/2 has gone into customer beta ready for a summer release. Freelance for OS/2 is almost ready for beta, while Approach and 1-2-3 are waiting on completion of the Windows 95 versions.

This delay hinges on Windows 95 versions because Lotus is using IBM's Developer API Extensions (sometimes abbreviated to DAPIE or DAX) in order to maintain a common core code set for both Windows and OS/2 versions of SmartSuite 96. This saves Lotus development money but means that OS/2 SmartSuite users can finally plan for feature parity with their Windows brethren.

Merlin

Lotus demonstrated WordPro and Freelance 96 for OS/2 at IBM's annual April developer gathering, where IBM also previewed the next version of Warp, Merlin (see *Figs 1, 2 and 3*).

At the time of writing: the Merlin beta won't be ready until June or July and will probably ship in August if all goes well; DAPIE was still being finalised by IBM, particularly the form in which it will ship. DAPIE will be part of Merlin but existing Warp users will have to add DAPIE support before being able to run any DAPIE applications. At the moment, users can only add DAPIE support to Warp 3.0 by installing FixPack #17 or later but adding an entire FixPack just for this reason is unwieldy. Lotus will simply add DAPIE support to it's SmartSuite distribution.

But smaller companies can't afford to take that cost. One such company is MGI in Toronto, which is into image processing. It has ported its budget-priced PhotoWorks image processing software from Windows 95 to Warp using DAPIE.

MGI says a single developer took five days to port 200,000 lines of C++ code to Warp. MGI's OS/2 product, renamed as PhotoSuite, will be available when Merlin ships but IBM PSP vice-president, Wally Casey, would only say that they were "looking into" how DAPIE support for existing Warp users would be provided.

Wally Casey was also unable to answer

Online locations

A reader complains that I haven't mentioned the most useful (to him) source of OS/2 help and assistance, the COMP.OS.OS2.* newsgroups — I thought I had, but there's no harm in mentioning them again. Be aware, however, that they are a wild and woolly read with lots of irrelevant chatter, too. There's certainly useful information in there but it's far quicker to ask a direct question than to search for the needle in a haystack. Remember, too, that there's little or no peer review on the Internet, so be sceptical.

For up-to-date information on OS/2 software happenings, try http://www.software.ibm.com

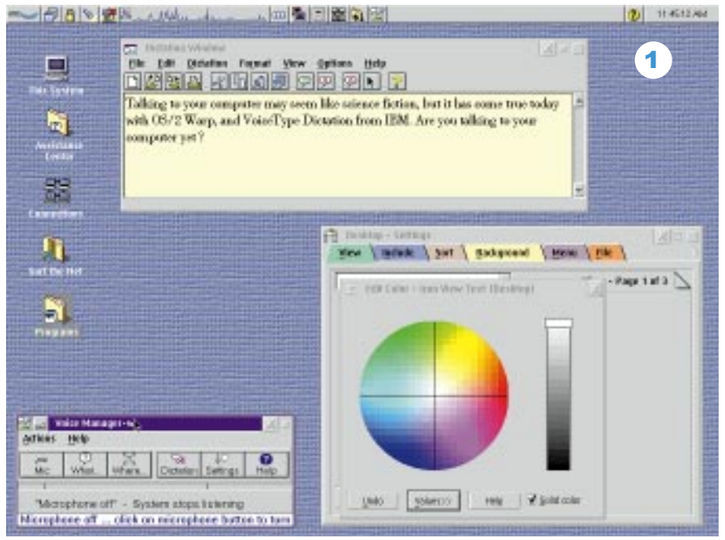


Fig 1 *Merlin, with the Lotus-originated WarpCentre along the top, colourful new Properties dialogues, formerly known as Settings Notebooks, and the promise of speech control and dictation*

Fig 2 *Merlin WarpCentre in action, showing drop-down menus which change dynamically to reflect the Desktop arrangement. The WarpCentre task bar can be placed anywhere on the desktop and LaunchPad is retained, in case you prefer that*

Uploads

This month, I've decided to include FixPack #17 as the OS/2 column's contribution to the cover-mounted CD. A number of readers have expressed a need for it but have pointed out that it's a rather large download at nearly 12Mb.

There are eight FixPack #17 diskette images and one separate file called WKICKR.ZIP, containing ancillary files that you will need to create the FixPack diskettes and to install the FixPack.

Personally I don't recommend installing a FixPack unless you're absolutely sure you need it but if you want to experiment, here's your chance. Please read the instructions very carefully before going ahead — I've included them separately as README.1ST.

README.1ST can also be found on FixPack #17 diskette, once you have created it from the image file. You need LOADDSKF.EXE to create diskettes from the images. LOADDSKF.EXE is included on CD-ROM versions of Warp but it's also in the WKICKR.ZIP file.

If you get as far as starting service and discover only an option to service the multimedia support but not Warp itself you may have previously installed a third-party device driver which messed with the system level file. To work around this problem copy SYSLEVEL.OS2 from your original install Diskette 1 over the corresponding file in the X:\OS2\INSTALL subdirectory on your Warp system.

Tel's tips and tricks

● If you've ever wondered how to remove a desktop object that the shredder rejects, try picking it up and dropping it onto a floppy disk. Right-click on the object to open the pop-up menu and choose "Pickup". Drag it to the floppy disk and right-click for the menu again. Select Drop and then the Move option.

● If you delete or move Warp and end up with a drive with "WP ROOT . SF" and "EA DATA . SF" files that you can't delete (because of the blanks in the filename) try this: ATTRIB *.?SF -R -S -H followed by DEL *.?SF. *Don't do this on a working Warp system!* The wild card characters "*" and "?" get around the blank character problem and the ATTRIB command removes the hidden and read-only attributes that would prevent deletion.

that other bugbear of image processing software users — when and how OS/2 would provide native scanner support for OS/2 sessions. Currently, users have to seek out one of the rare scanner software packages that supports OS/2, or set up a Win-OS/2 session, or even boot into DOS/Windows to scan images.

Casey was a little more helpful on the subject of device drivers in general. You know how Windows always seems to include drivers for hardware that OS/2 users have to track down in obscure FTP sites? Up until now, IBM has only shipped third-party device drivers that have been through a rigorous certification process (don't laugh!). Starting with Merlin, IBM will collate all those scattered drivers and ship them with the distribution CD.

Hopefully Merlin will be a marker showing that IBM has finally understood that it needs to get its act together on device drivers, make installation and configuration even easier and stimulate applications development but Casey's April preview was short on detail, preferring to show off the new user interface and speech input. If Merlin turns out to be no more than another technology demonstration without the follow-through, pressing start in order to stop is a minor detail.

Wizard WARP

Merlin was shown at the IBM Technical Interchange in Nashville last April. The major new feature announced was support for speech navigation and dictation but the user interface has been given a complete work-over, too.

The user interface is looking pretty good. IBM hired a designer to come up with a new Warp system font which is much more legible, especially on mobile LCD screens, and there's some imaginative use of colour and 3D icons, too.

The Warp LaunchPad is superseded by the WarpCentre taskbar. This is a port of the Lotus SmartSuite SmartCentre. And guess what? Merlin has Wizards, er… I mean Warp Guides, to simplify configuration.

What was missing at the preview was detail on how the connected user will take advantage of Internet developments. Apparently there are at least three Internet-related announcements still to come regarding Merlin. The first was made a few days after the Technical Interchange when IBM announced that Java support would be included in the base operating system. The other two must be related to web browsing and email. UltiMail is dead so email support will have to come from Lotus, either cc:Mail or NotesMail — cc:Mail is a possibility as it is being withdrawn from SmartSuite OS/2 but I think a Notes desktop client with NotesMail is the likely choice for Merlin.

The browser situation is also up for grabs. According to Wally Casey, Merlin will have a state-of-the-art browser. IBM's Web Explorer was terrific when it first shipped, in December 1994, but is no longer state-of-the-art. It's possible that Web Explorer could leap a generation but the chances are that an OS/2 version of NetScape will be included instead.

Fig 3 *A number of Web sites have started using Adobe's Acrobat format .PDF files. An OS/2 Acrobat reader can be downloaded from http://www.adobe.com. Look for the "Get Acrobat" page. If it has gone by the time you get there, hassle Adobe… they were asking how many people wanted an OS/2 version*

PCW Contacts

Terence Green can be contacted either by post c/o *PCW* or by email to **tgreen@cix.compulink.co.uk**.

Golomb rules, **OK**

Mike Mudge deals with the concept of perfect and imperfect rulers.

"Golomb rulers"

…with a pre-metric introduction

(Inspiration acknowledged from Malcolm E. Lines' Think of a Number *[1990. Adam Hilger. ISBN 0-85274-183-9] chapter 11, pp 101-105.)*

Consider a one-foot ruler having only inch markings: for the benefit of younger readers this represents a uniform scale of length, with 12 equal sub-divisions.

We see that there are 12 ways of measuring one unit of length, *viz*. 0-1, 1-2, 2-3,…11-12; also, seven ways of measuring six units of length, *viz*. 0-6, 1-7,…6-12; with four ways of measuring nine units of length 0-9, 1-10, 2-11, 3-12. Clearly,there is considerable redundancy in this instrument.

Starting with a "trivial prototype" ruler of unit length marked 0 & 1, this measures one possible distance in one possible way. However, a two-length ruler with three markings at 0, 1 & 2 has already introduced an inefficiency since it measures one unit in two different ways, *viz*. 0-1 & 1-2. However, if the marks are at 0, 1 & 3 we have a ruler measuring distances 1, 2 & 3 each one way only.

Pencil and paper study should convince the reader that it is not possible to construct a ruler which will achieve this for either 4 or 5. Marks at 0, 1, 4 & 6 generate such a ruler (called PERFECT) of length 6, since either of the distances 1, 2, 3, 4 & 5 can be measured in one way only. This idea is originally due to Professor Solomon Golomb of the university of Southern California; see later reference.

Now a ruler with five marks can measure ten distances, therefore if it were a PERFECT ruler it would be of length 10. Note that a ruler can be IMPERFECT in two distinct ways:

(a) there may be some distances which cannot be measured;

(b) there may be some distances which can be measured in two or more ways.

The "next best thing" to the non-existent perfect five-mark ruler might possibly be defined as one that contains each measurable distance only once, but which is unable to measure every possible distance up to the length of the ruler. Clearly not an adequate definition since a five-mark ruler, marked at 0, 4, 10, 27 & 101, measures distances of 4, 6, 10, 17, 23, 27, 74, 91, 97 & 101 each one way only. the challenge is to find the SHORTEST ruler which does not measure any one distance in more than one way.

The shortest five-mark ruler is of length 11; with mark positions at 0, 1, 4, 9, 11, i.e. one unit longer than the PERFECT TEN. The only length less than ten which it cannot measure is 6. In general, the shortest ruler with n-marks is called the "n-mark Golomb ruler" in honour of its inventor. Malcolm Lines lists all of the Golomb rulers known to him in *Fig 1.*

Fig 1 Golomb rulers

Number of marks	2	3	4	5	6	7…	13	14	15
Golomb length	1	3	6	11	17	25…	106	127	151

The fifteen-mark Golomb ruler has marks at 0, 6, 7, 15, 28, 40, 51, 75, 89, 92, 94, 121, 131, 147, 151.

Now to research! There exists a formula which yields the shortest length that a Golomb ruler with any particular length can possibly have. This yields the entries in row L (Lower bound) shown in *Fig 2.*

Fig 2 The entries in row L

Number of marks	16	17	18	19	20	21	22	23	24
Shortest known	179	199	216	246	283	333	358	372	425
L	154	177	201	227	254	283	314	346	380

Problem: Golomb

The following quotation is intended to inspire readers to investigate the problem of Golomb rulers: "In co-operation with a personal computer, it is quite likely that the enthusiast can improve on some of the 'shortest known' rulers in the above table, although a demonstration that the actual Golomb ruler has been located is probably beyond all but the most powerful of today's computers." (*M.E.L. 1990*).

Investigate the table at *Fig 2*, extending where possible and making a serious attempt to quantify the difference between any "shortest known" results, i.e. from a particular algorithm, and the actual length of the Golomb ruler. Further, how do these values differ from L?

Any investigation of the above problem, together with comments on the concept of Golomb rulers (which do have applications in both radio astronomy and satellite communications) may be sent to Mike Mudge, 22 Gors Fach, Pwll-Trap, Carmarthenshire SA33 4AQ (tel 01994 231121) to arrive by 1st November. All material received will be judged using suitable subjective criteria and a prize will be awarded, by Mike Mudge, to the "best " entry arriving by the closing date. Such contributions should contain brief descriptions of the hardware and coding used, together with run times and a summary of the results obtained. (SAE for entries to be returned, please.)

Some simply-posed problems for beginners

P1) Does there exist a positive integer n greater than 7 for which n! + 1 is the square of the integer? It is known that if n exists it must be greater than 1020. *M.Kraitchik (Paris, 1924)*.

P2) Obtain all solutions in integers of the equation $x3 - y^2 = 18$. It has been proved that the number of solutions is finite but it is not known how many there are.

P3) Do there exist three rational numbers (i.e. fractions with integer numerators and integer denominators) whose sum and product are each equal to 1?

PCW *Contributions Welcome*

Mike Mudge welcomes readers' correspondence on any subject within the areas of number theory and computational mathematics, together with suggested subject areas and/or specific problems for future *Numbers Count* articles.

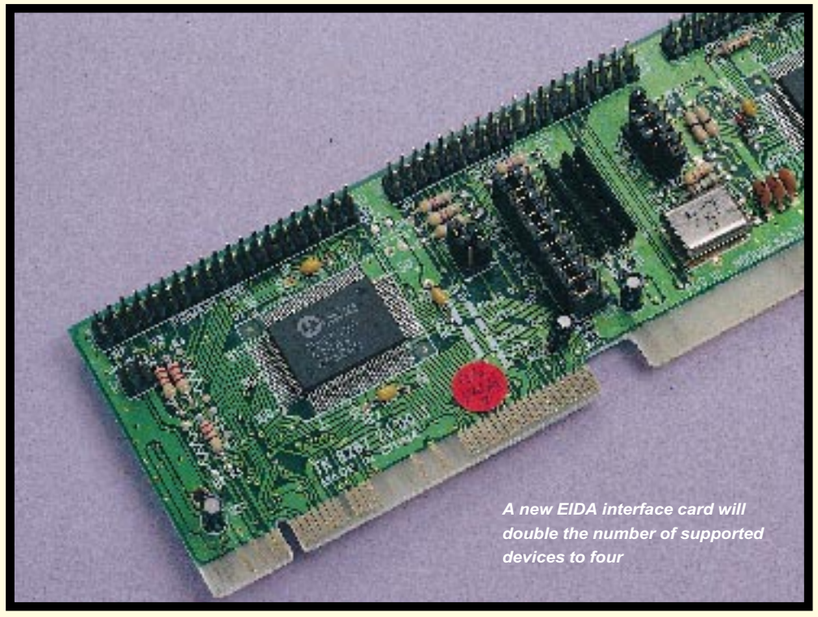
Magic **card** trick

A bigger hard disk is increasingly affordable, but it could cause compatibility problems. Roger Gann shows how you can use EIDE to overcome them.

Given the bloated nature of modern 32-bit operating systems and applications, these days it isn't so much a question of "if" but of "when shall I fit a bigger hard disk?" Luckily, big new hard disks have never been more affordable. Almost uniquely among computer components, they have simultaneously grown in size and speed while their prices have plummeted. Today, you can pick up a good-quality 1Gb drive for £160 or less – just two years ago I paid £700 (sob!).

The drop in price is great, but the overall increase in size can be a problem, at least from the compatibility point of view. It's now becoming difficult to buy disks smaller than 540Mb and older machines can't directly support these larger disks without resorting to software trickery. This is no big deal for DOS+Windows 3.1x, but for Windows 95, which uses 32-bit protected-mode drivers, the presence of real-mode drivers can result in reduced performance.

A much more elegant solution is a low-cost hardware upgrade to give support for larger drives and let Windows 95 handle the drives directly. In this month's column I'll take you through the process of upgrading to Enhanced IDE (EIDE) and I'll complete the piece next month by showing you how to install a new large hard disk.



A new EIDA interface card will double the number of supported devices to four

Size solutions

There are several solutions to the IDE size problem (see page 295). Most large EIDE hard disks come complete with special device driver software that permits the PC to recognise the entire capacity of the drive. They work by placing a BIOS overlay in the boot sector, which is the same for all IDE drives, regardless of size. The overlay is loaded as soon as the drive boots, and it provides the support for large partitions that is missing from an older BIOS.

The down side of this solution is that it won't give you a second IDE channel, which is useful for connecting up slow IDE devices such as CD-ROMs and tape streamers. Also, it's likely that Windows 95 will run its file system in the slower MSDOS compatibility mode. Even under Windows 3.1x, a special driver is still required, to restore both 32-bit Disk Access and 32-bit File Access. Another more worrying problem is that if for any reason you lose the special driver, DOS won't be able to "see" the big hard disk.

A better option is to buy an inexpensive EIDE interface card. These cost about £35 and are a direct replacement for the £10 multi I/O cards fitted in most popular PCs. Examples include the VL-Bus Promise EIDE2300-Plus and the ISA Bus Future Domain IDE-16042. Both include two IDE channels and a floppy-drive interface. The Promise also features enhanced serial and parallel ports, which is a useful upgrade if you have a fast modem or a printer that needs a "bi-di" printer port. And, of course, they both include an on-board BIOS that supports enhanced IDE: this supplements your existing BIOS.

The only drawbacks I can think of is that you'll possibly lose an expansion slot, and the additional BIOS steals a little (16Kb) Upper Memory.

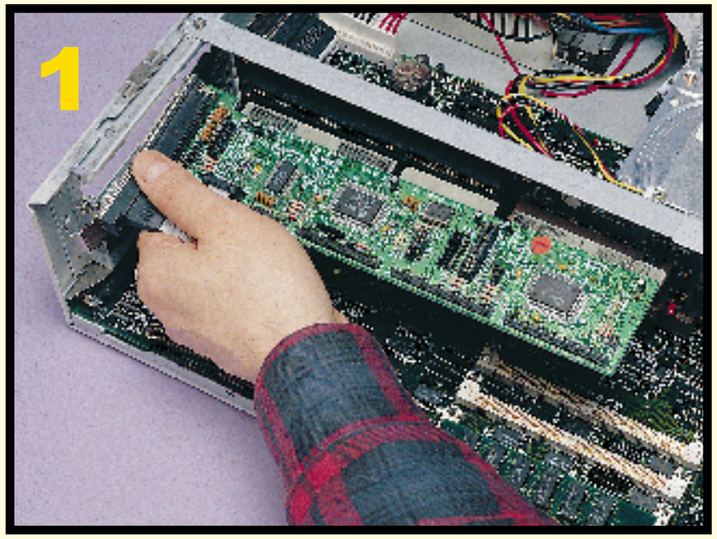
Another good reason for going down the EIDE card route is that you gain a second IDE channel. This doubles the number of IDE devices supported to four: you could, in theory, hang four IDE hard disks off such a card, with a master and slave drive attached to each channel. However, a more likely scenario would be a pair of Enhanced IDE hard disks on the primary or EIDE channel and slower IDE devices, designed for the ATA Packet Interface (ATAPI) standard such as CD-ROM drives or tape streamers attached to the secondary or IDE channel.

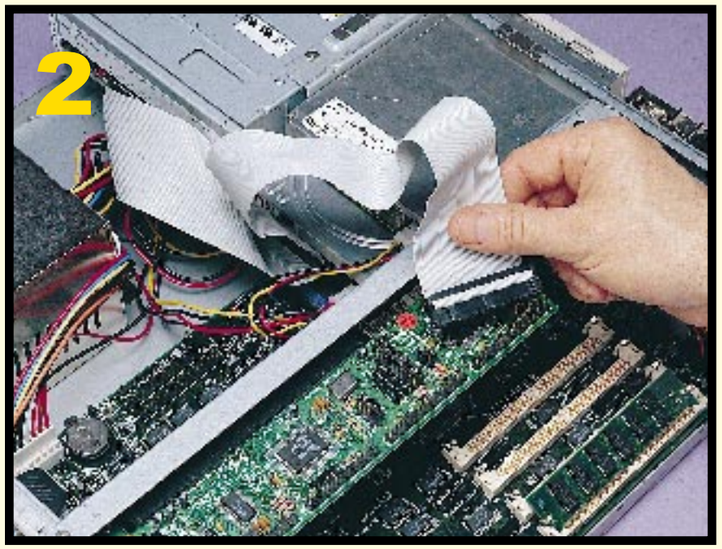
The received wisdom is that it's a good idea to give IDE devices with wildly differing data transfer rates separate IDE channels. At its peak, an EIDE drive using Mode 4 can transfer data at rates as fast as 16Mb/sec; a typical quad-speed CD-ROM drive knocks it out at 600Kb/sec. The lowest common denominator rule applies again here and there will be occasions when the data transfer rate of the hard disk will be pulled down to that of the CD-ROM, especially where both are in use simultaneously, for example when you're installing software from CD-ROM. With 8X CD-ROM data transfer rates now approaching 1.2Mb/sec and beyond, this speed differential is set to become less of a problem, but it's still something most of us have to watch out for.

Yet another benefit of EIDE is speed. A new EIDE interface card will support the lightning fast data throughput of the new drives . There are four types, or modes, of Polled I/O or PIO transfers and the fastest drives now support Mode 4 which, as we've seen, can offer data transfer rates as high as 16.6Mb/sec. The most your existing Mode 0 IDE can manage is 3.3Mb/sec.

A word of caution here: these are maximum burst rate figures, and the actual data throughput for Mode 3 and Mode 4 drives will be significantly lower than those numbers indicate. Note too that to upgrade to EIDE you'll need a motherboard with a local bus. These speeds demand a 32-bit VL-Bus or PCI local bus; the 16-bit 8MHz ISA bus can't support these levels of throughput.

So, as a prelude to upgrading your hard disk, we'll replace your existing IDE interface card with a new EIDE interface card. As we'll be leaving your existing hard disk *in situ*, there's no special need to back it up; and in any case, you probably already have recent backups of your hard disk, don't you?





(1) *Here, a new EIDE disk controller is fitted into place. This one is designed for a VL-bus*

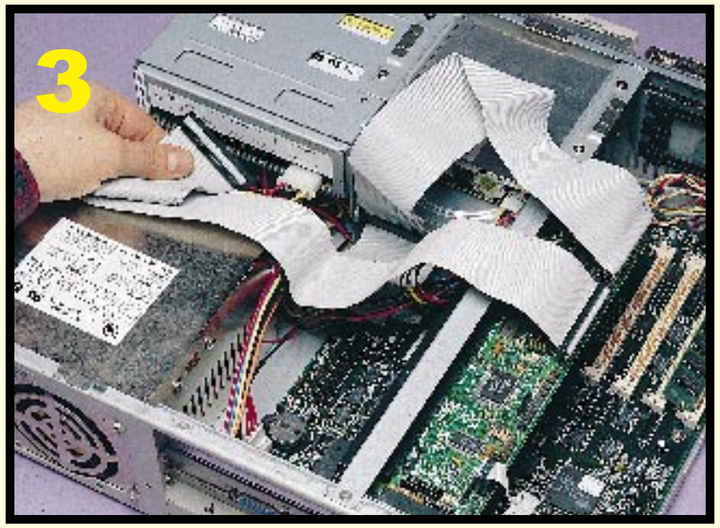
(2) *It is possible to daisy-chain the hard disk and CD-ROM drive together on the same channel, but this is not recommended due to their different data transfer rates*

Step-by-Step

INSTALLING ENHANCED IDE

Step 1

● Make the usual preparations: clear a work space and get out your Phillips screwdriver. Power down and unplug the PC from the mains and disconnect all other leads, such as printers and mice. Before handling any electrical components, discharge any static electricity you might be carrying by earthing yourself: touch a metal pipe, for instance, or the



(3) *The CD-ROM drive is generally fitted into the secondary IDE channel on the EIDE card*

PC's chassis. Undo the four or five screws and take the lid off the PC.

Step 2

● Locate the existing IDE interface card and disconnect the ribbon cables from it. You may also have to unplug any external serial ports. Undo the screw holding the card in and extract the card from its slot. Put it somewhere safe. If your PC features I/O integrated in the motherboard, there's nothing to remove, but you'll have to disable at least the onboard IDE interface, and more if the new card has a floppy interface and serial and parallel ports.

Step 3

● Configure the new EIDE card before you fit it. These early cards are definitely not plug-and-play; they are often festooned with jumpers and may require adjustment to avoid clashes. For example, the EIDE2300Plus defaults to using DMA Channel 1, which is the same as the default setting of a SoundBlaster card. If you have one of these you should use the alternative, DMA 3, and move the appropriate jumpers. Also, don't forget that the second IDE channel steals another IRQ, typically 15, so make sure this IRQ is free. When you're done, find a spare slot for the new EIDE interface card and insert it. Tighten up the fixing screw.

If you're adding a PCI EIDE controller, note that most PCI systems can't map IRQs 14 and 15 to a PCI slot. Since those interrupts are typically needed by a disk controller, you should have a workaround, which comes in the form of a ribbon cable and paddle card. Luckily, this can plug in to the otherwise unusable ISA "shared" slot, so you don't lose a slot. This card allows the controller to tap interrupts 14 and 15 through the ISA connection. Some newer PCI motherboards offer a separate connector, called a legacy connector, near one of the PCI slots to provide the needed IRQ. For these systems, you simply connect the ribbon cable from the EIDE card to the legacy connector rather than to a second ISA card.

Step 4

● Now refit the hard disk drive's 40-way ribbon cable. Modern ribbon cables are polarised with a notch to prevent you inserting them the wrong way round, but some aren't, so look for a red or coloured stripe on the ribbon cable. This indicates Pin 1. Look at the socket on the new interface card for the Pin 1 label to correctly orient the plug. Be sure to plug it in to the E-IDE/primary (and not the IDE) port on the EIDE interface card, making sure to align the coloured edge with Pin 1.

Because of the very high data transfer rates possible thanks to EIDE, you have to be careful with the ribbon cable and you mustn't use one longer than 18 inches. Don't forget to plug in the 34-way floppy ribbon cable on to the floppy interface on the EIDE card, making sure to get it the right way round. Reconnect any serial or game port cables, too.

Step 5

● If you have an IDE CD-ROM, now's the time to give it its very own IDE channel. Use a separate 40-way ribbon cable to connect it to the secondary IDE channel on the EIDE card. Don't forget to set it to be a "master" IDE device if it has been set to a "slave" previously (though in my experience, this doesn't seem to matter too much). Do this by moving a jumper at the back of the drive.

Step 6

● Reassemble the PC, put the lid back on, do up the screws, plug all the cables back in and power up the PC. Check the CMOS setup and get the BIOS to auto-identify the hard disk just to make sure that all the cabling has been installed correctly. Some EIDE cards may let their own BIOS handle the hard disk totally and insist therefore that you set the Drive Type on the PC's BIOS to "Not Installed". Your PC should reboot at this point. If it doesn't, re-check the cabling, especially the Pin 1 process.

Step 7

● Now's the time to install the card's Windows 3.1x and Windows 95 drivers. For Windows 95, fire up Control Panel, click on the "Add New Hardware" icon and opt for the manual install. Select "Hard Disk Controllers" and click on the "Have Disk" button. Place the driver disk in the floppy and click on "OK". When that's done, restart Windows 95.

Explanation of acronyms and terms used

● Hard drive and peripheral interface standards

BIOS	Basic input/output system.
EIDE	Enhanced integrated drive electronics.
IDE	Integrated drive electronics.

● Other terms

ATAPI	AT Attachment Packet Interface.
CMOS	Complementary metal-oxide semiconductor.
DMA	Direct Memory Access.
IRQ	Interrupt Request Line
PIO	Polled (or programmed) input/output.

The IDE ceiling

While a PC's standard BIOS is theoretically capable of supporting hard disks as large as 8Gb and IDE drives can reach 130Gb in size, the real size limitation is just 504Mb. This low figure is the result of a clash between the drive geometries (the number of cylinders, heads and sectors per track) supported by each hardware standard. Unfortunately, these differ substantially and DOS defaults to the lowest common denominator in each case, hence the 504Mb limit. The table below highlights the problem:

	BIOS	IDE	Lowest value
Max. sectors per track	63	255	63
Max. heads	255	16	16
Max. cylinders	1,024	65,536	1,024

The maximum size of a hard disk drive is derived from multiplying these values, (sectors x heads x cylinders) by 512 (the number of bytes in a sector), so you'll end up with the following capacities, in bytes:

```
8,422,686,720
136,902,082,560
528,482,304
```

Or, to express these values in megabytes, we divide them by 10,242 or 1,048,576:

```
8,032.5Mb
130,560Mb
504Mb
```

And that's how we wind up with the half gigabyte IDE limitation. Two years ago it wasn't a problem as IDE drives were no bigger than 420Mb and only SCSI drives were larger. As they used their own BIOS, the limit didn't apply to them. However, with today's large IDE drives, the 504Mb limit is a very real problem for older PCs.

PCW Contacts

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Model behaviour

Benjamin Woolley gets moving on the animation abilities of Autodesk's new 3D Studio Max and Fractal Design's Poser.

Within Autodesk, they called it the "AutoCAD burp". Every time AutoCAD (the world's most widely used CAD program) had a hiccup the whole company would shake. AutoCAD accounted for the majority of the Autodesk's income, pushing all the software publisher's other products and 3D Studio in particular, into second place.

Autodesk has now taken action to cure this bad case of corporate indigestion by setting up Kinetix (www.autodesk.com/kinetix), a division totally devoted to 3D graphics. The man in charge of Kinetix, Larry Crume, says the division's motto is: "We Be Three Dee". And to mark its birth, Kinetix has been given the job of launching one of the most eagerly awaited packages on the computer graphics market, 3D Studio MAX (*Fig 1*).

MAX has been a long time coming; so long that it was the subject of an April Fool's joke in the *Tessellation Times* (Tess for short), an American computer graphics publication. According to Tess, the arrival of MAX was delayed because Autodesk had been in dispute with the creators of the Max Headroom character, over the use of the name.

In fact, the delay had been caused by the usual problems of getting the code (and in particular the renderer) completed on schedule. The finished version finally started shipping at the beginning of May, which is when I got my copy, neatly packaged in a box bearing the Kinetix logo and accompanied by a document entitled "Reviewer's Guide" (designed, it appeared, to steer me towards looking at all the things the software is good at and away from all the things at which it is bad).

MAX has been eagerly awaited by users of the venerable DOS-based 3D Studio, which is beginning to show its age. it was also keenly awaited by the rest of the computer graphics world because of 3D Studio's undoubted impact on the market. The Reviewer's Guide informs me that 3D Studio is "the world's best selling professional 3D rendering and animation system with over 65,000 installations". This might be true. AutoCAD has helped beat a path to the doors of countless CAD departments around the world, in need of a 3D package to help them visualise and demonstrate their designs.

MAX is not, the company keeps saying,

Fig 2 *A sample image supplied by Kinetix to show off MAX's new renderer. By old 3D Studio standards, the sharpness of the highlights combined with the softness of the atmosphere is good*

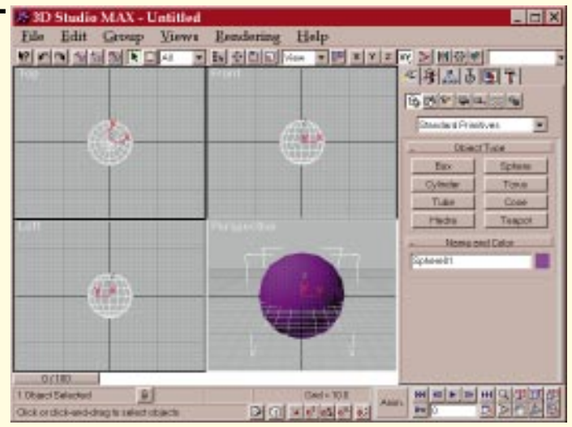

Fig 1 *The MAX interface is "modeless": you do not have to swap between different modes when performing different functions such as animating or modelling*

a new version of 3D Studio (which is still shipping as Release 4). It is a complete rewrite. It runs natively under Windows NT rather than DOS. (It will run under Windows 95, but you get a warning when you run Setup that it may not run properly — this proved to be the case when I tried it). Autodesk will only support NT.

It is structurally different, too, as it uses object-based programming techniques. All the tools in MAX are programming objects

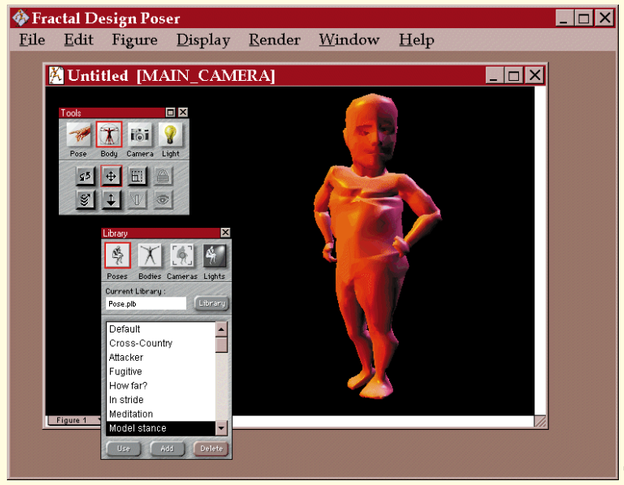

Fig 3 *Poser's interface, showing a rendered baby male figure (the difference from a baby female figure is not obvious)*

— DLLs that plug straight into the operating environment. Every component can be replaced or enhanced, even the renderer.

The renderer supplied is supposed to be an improvement on the rather plastic affair supplied with the DOS version of 3D Studio (*Fig 2*), but even if it turns out to be unsuitable, it will be possible to buy other renderers. Autodesk showed me a ray tracer, being developed by a Scandinavian company, which even in Beta form looked promising

I have only just started to experiment with the package, but one thing that is clear from the start, is that it demands a workstation-class system. My 16Mb Compaq Pentium didn't even come close. The company recommends 32Mb of RAM, a Pentium Pro (or two — MAX supports multiprocessor configurations) and graphics acceleration.

The key to MAX's success will be its object-orientated architecture. All registered users will be entitled to the Software Development Kit so, if literate in C++, they will be able to produce their own extras. A few plug-ins (no longer called IPASes) are already available — for example a VRML converter — and loads more are promised.

Character building

One of the most eagerly awaited MAX plug-ins is Character Studio, which comprises two tools: Biped and Physique. Judging by a brief demonstration of these, it looks as if they will provide a powerful system for animating humanoid characters. Biped is particularly interesting as it allows you to animate a mannequin simply by establishing the position of its footprints. You string a series of prints out on any surface and watch Biped work out all the steps, including ones that traverse stairs or uneven terrain. Character Studio is likely to cost several hundred pounds when it is released later this year.

A simpler and cheaper alternative is an intriguing product from Fractal Design (www.fractal.com), the company that brought us the excellent Painter 4 bitmap editor (see *Hands On*, June). Called Poser, the package comprises meshes for human figures, a library of poses that these figures can strike and tools to manipulate both figures and poses.

The elements that make up the figures are hierarchically linked (in the words of the old song: "The thigh bone's connected to the knee bone, the knee bone's connected to the shin bone…"), and these linkages contain an element of what the pros call inverse kinematics. When you move the hand, for instance, the rest of the arm follows in a way that is roughly equivalent to the movement of a real arm.

Despite these aids, manipulation of the figures can still be tricky, and I was soon forcing my unfortunate mannequins into bone-breaking contortions. The figures themselves are quite simple: you can have male or female, in sizes ranging from baby to "super-hero", and there is a library of poses, such as "fugitive" and "thinker".

In *Fig 3* you can see the baby male figure. Its mincing pose is one of those supplied in the library, entitled "model stance". The baby has been rendered using Poser's own renderer. This allows simple textures to be applied to the models, such as clothing (though it always has to be skin tight). Note that the baby, like all the models, is anatomically incorrect in certain vital respects.

Poser's real potential for serious 3D users is for creating and posing models to be imported into other 3D packages. Unfortunately, the only 3D output formats are DXF and RIB (the Pixar Renderman format). DXF, essentially a CAD format, is common but crude. The file format does not contain mapping co-ordinates, which is a shame as all the Poser figures have mapping properly applied while used within the package (a texture map wraps around the figure no matter what pose it strikes). Poser is a nicely designed and well documented package, and if other file formats were included (the 3DS format, for example), it would be extremely useful.

Memory palace

In previous columns I have mentioned a project that I play with in my spare time entitled the "Memory Palace". My use of the term provoked the interest of a reader, Alan Mackay, a professor at the University of London. Memory Palaces were a medieval invention. They were not real buildings, but imaginary spaces created by story tellers in order to remember the sequence of events in a long tale. The tale would be broken up into rooms, each of which contained objects representing events in the story. By mentally retracing their steps through these rooms each time the story was told, the teller would recall the sequence of events.

The secret of a good memory palace is to make the rooms and the objects they contained as memorable as possible, which in medieval times meant filling them with violent and sexual images.

Nowadays, literacy is a little more widespread than in the days when memory palaces were created to help people retrace a long story. But as Mackay had noticed, the idea has applications to the way we store and retrieve information in our burgeoning disks and networks.

What if a system were represented not as a boring old office but as a palace made up of rooms containing striking icons and lurid objects representing the information the system can access? What if navigating the Web was not a matter of URLs and home pages, but a trip through an endless gallery of fabulous rooms, each furnished with objects acting as pointers to particular area of interest?

Several years ago, Mackay proposed a research project looking into some of these ideas, but the funding body for computer research at the time was not interested. Perhaps now is a good time to have another look at the issue.

PCW Contacts

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Fontastic!

OpenType format may herald an end to the font wars: Gordon Laing examines the implications. Plus, CorelDraw for the PowerMac, fonts in Windows 95, and a real smooth operator.

Lots of font news this month. First on the agenda is Windows 95 and how it handles fonts, including enhancements over 3.x. Next is the spectacular news of the forthcoming OpenType format, developed by Adobe and Microsoft, which, it is claimed, will end the TrueType and Type-1 font wars by tying the two together. But before launching head first into fonts, here's a short aside for those who, like myself, didn't believe CorelDraw for Macintosh would ever make it beyond a myth.

Canadians bite the Apple

Yes, it's true! CorelDraw is finally going to happen for the Apple Macintosh platform. I've just got hold of far-from-finished Beta-1 and Beta-2 copies, although the ever-optimistic Canadian company is convinced that the final shrink-wrapped product will be available by the end of summer.

First things first: it's Power Macintosh only, without any plans for a 68000 version. You'll need a decent-spec machine too, with at least 16Mb of RAM and, of course, stacks of disk space if you want to install the ubiquitous clip-art and fonts.

Despite rumours of version 7 for Windows by the end of the year, Corel has opted to release version 6 for the Mac. It is, however, quite a different package to version 6 for Windows.

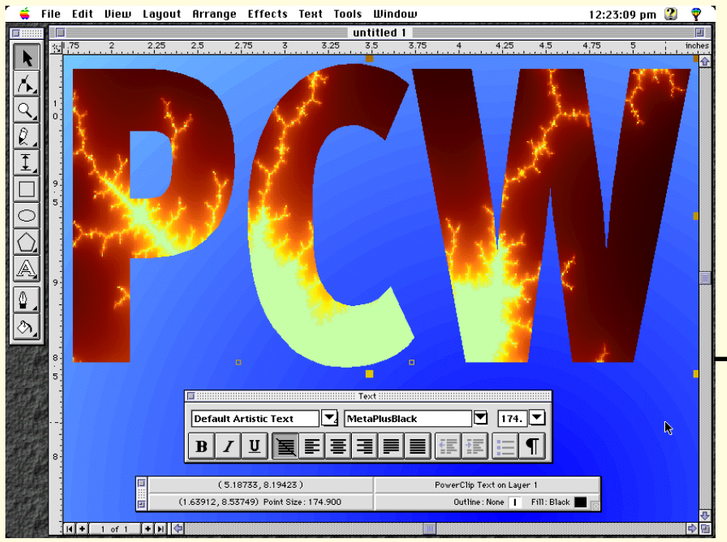
The main drawing and layout application itself is present, although with a new-look interface. Corel PhotoPaint, the Windows bitmap photo-retouching editor, is missing, but is replaced by something similar called Corel Impressionist.

CorelTrace, used to convert bitmaps into vector form, is here, as is CorelDream 3D, the modelling and rendering module, new to Windows version 6 although seen here in a later form. A brand new texture generator, CorelTexture, is unique to the Macintosh suite, as is the inclusion of WordPerfect 3.51, fresh from the Corel acquisition. But get this: there are rumours of Corel bundling Draw alone with its forthcoming Windows office suite.

Fonts are handled by the Master-Juggler utility, while Kodak Precision Colour Management System looks after… well, the colour management. CorelDraw wouldn't be the same without the reams of clip-art and font libraries, and indeed, the Mac pack sports a similar but not identical array to the Windows version.

CorelDraw 6 for Macintosh will undoubtedly offer excellent value with its many applications, utilities and extras. While there are some differences, the drawing portion is claimed to be 100 percent compatible with files created in CorelDraw 3, 4, 5 and 6 for Windows (our early copy was almost 100 percent). Corel reckons users will include those familiar with the PC version, or those in mixed platform environments desiring compatibility — there are certainly some curious Mac users out there who want to see what all the fuss is about.

It is doubtful whether Mac illustrators will become evangelical and wholeheartedly embrace the other side — I remain a firm believer in FreeHand — but at least the option is there. More importantly, a company as competitive as Corel will shake up the market and force complacent products to shape up or get out.



Some said it would never happen, but it's finally on the way: CorelDraw for Power Macintosh, expected for release sometime this summer, complete with the usual array of programs, fonts, clip-art and freebees we've come to expect from the Canada-based graphic gurus

Font frenzy

Anyone using Windows 95 may think it handles fonts in essentially the same way as Windows 3.x, but there are in fact quite a few enhancements for TrueType. As explained last month, Microsoft and Apple developed the TrueType font format together and have built software into their respective operating systems to rasterise the outline shapes.

Adobe Type Manager, ATM, is required to rasterise Adobe Type-1 PostScript outlines for either Windows or the Macintosh. You'll need ATM 3.02 to work under Windows 95, but it doesn't offer any enhancements over earlier versions designed for Windows 3.x. Windows 95, however, boasts many built-in enhancements for the TrueType 1.0 format to enhance performance and appearance, and support international characters.

You'll be pleased to learn that Windows 95 has a 32-bit TrueType rasteriser, which performs outline-to-bitmap conversions much quicker. Converting vector outlines into bitmaps at very small point sizes often results in an illegible character, due to too few pixels to play with. Hinting is the process of adding information to a character's outline, slightly altering various aspects to improve its appearance at small point sizes. The TrueType hinting process actually works quicker with the new 32-bit rasteriser.

Windows 95 also supports TrueType fonts with embedded bitmaps. Sometimes, even with hinting, a character is just too complicated to be rendered legibly at small point sizes. In these instances, a pre-rendered bitmap may be automatically substituted. This process is transparent to the application and the user.

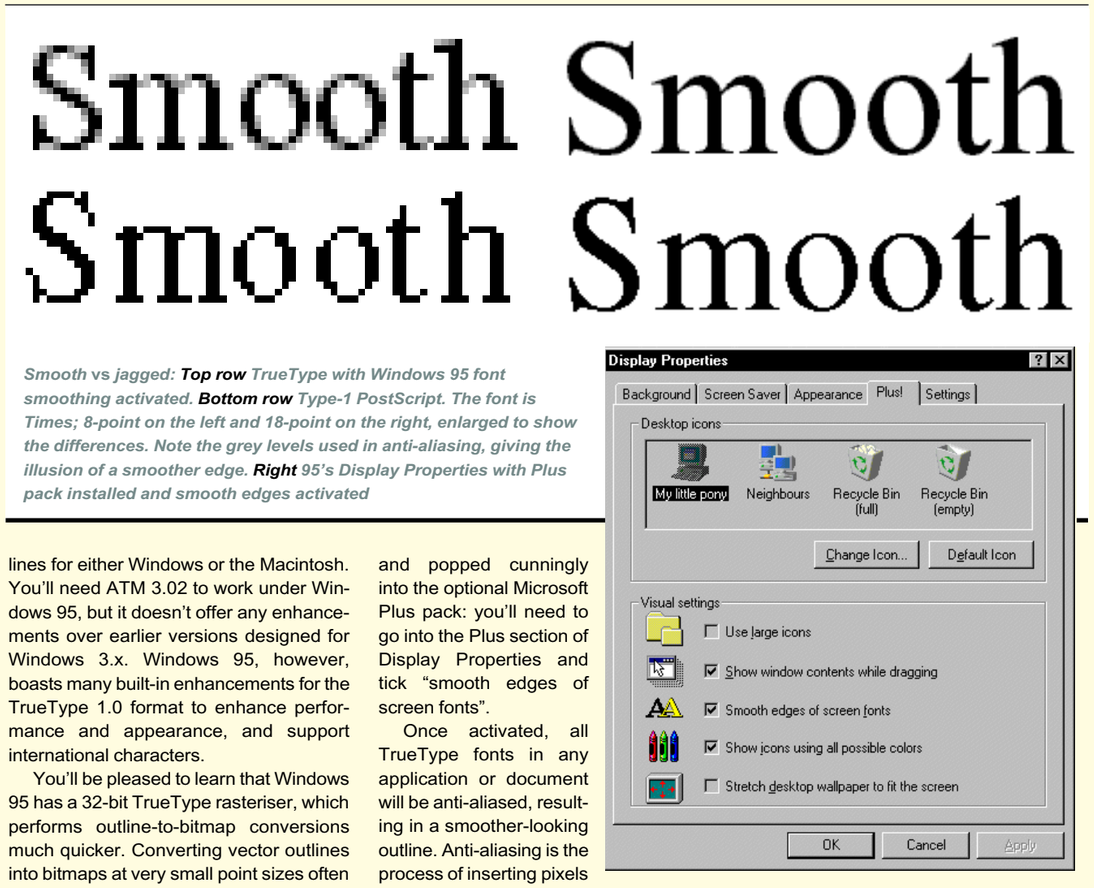
File space is used more efficiently by allowing TrueType fonts to share common character shapes, avoiding unnecessary duplication. Microsoft manages this with a TrueType collection (TCC) file, as yet implemented only in the Far Eastern version of Windows 95.

Greyscale rasterisation is responsible for the greatest improvement in TrueType appearance under Windows 95, although the feature was removed from the beta and popped cunningly into the optional Microsoft Plus pack: you'll need to go into the Plus section of Display Properties and tick "smooth edges of screen fonts".

Once activated, all TrueType fonts in any application or document will be anti-aliased, resulting in a smoother-looking outline. Anti-aliasing is the process of inserting pixels of intermediate background and foreground shade into the jagged steps of a bitmap, which fools the eye, at a distance, into perceiving a smoother shape. Under Windows 95 it works very well, and is particularly noticeable when compared side by side with non-anti-aliased type. Check out our example *[above]* with and without smoothing. The smoothy is a TrueType font, while the jaggie is a Type-1 font; sadly, ATM does not offer an anti-aliasing facility despite one being available for type within Adobe Photoshop.

Windows 95 uses three intermediate levels of grey, along with plain black and white, to create a smoothed character. The greyscale converter figures out which level of grey to use by considering how much of the original outline would fall into the pixel's space. If a large percentage of the outline falls into the pixel's area, a dark grey is chosen, while a small percentage would result in a light grey.

Next month I'll be delving into the complexities of character sets, particularly those with more than 128 or 256 on offer, ideal for complex languages. In the meantime, Windows 95 supports a curious halfway house between Windows ANSI (256 character) and double-byte sets (up to 65,536 characters). It's called Windows Glyph list 4 (WGL4) and was developed by Microsoft. Described as a Pan-European character set, WGL4 consists of 652 characters required in Western, Central and Eastern European writing systems, including Greek and Turkish.



*Smooth vs jagged: **Top row** TrueType with Windows 95 font smoothing activated. **Bottom row** Type-1 PostScript. The font is Times; 8-point on the left and 18-point on the right, enlarged to show the differences. Note the grey levels used in anti-aliasing, giving the illusion of a smoother edge. **Right** 95's Display Properties with Plus pack installed and smooth edges activated*

OpenType

Now for this month's big news. As reported in last month's *Newsprint*, the font format wars could be over. Adobe and Microsoft have got together to develop the OpenType font format, which combines TrueType and Type-1 technologies. Right now details aren't 100 percent solid, but here's what I've gleaned so far.

To be accurate, OpenType is an extension of TrueType Open, with added support for Adobe Type-1 information. An OpenType font could contain either TrueType or Type 1 information, or both. The interesting and slightly unclear part is what, precisely, will do the rasterisation.

Font of the Month

Orange

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abçdéfghijklmnöpqrstuvwxyzßЄ1234567890

After months of serious body fonts I thought it was time for a bit of fun. This month and next sees the return of the display face to my *Font of the Month* section. Here's Orange, from the Fontek collection, available from FontWorks. Fontek has a wide range of single-weight display faces selling for only £35 (plus VAT) — a welcome change from pricey type collections.

TrueType information will be rasterised as usual by software built in to the operating system, while Type-1 information will be rasterised by ATM. However, there is said to be some means by which Type-1 information could be converted to TrueType, probably to be implemented in the next version of Windows 95 and, presumably, Macintosh System 7. This could mean the end of ATM, unless Adobe comes up with (or even wants to come up with) a super-duper new version, with outstanding facilities and support.

All existing Type-1 and TrueType fonts will be supported by OpenType and should work transparently as far as the user is concerned. Microsoft and Adobe will promote and develop OpenType fonts, while Adobe will convert some of its popular Type-1 fonts to the OpenType format. This certainly implies the end of ATM in favour of OpenType support built in to the OS, although the possibility of a Type-1 rasteriser built into Windows has not yet been dismissed. Either way, thanks to the Type-1 to TrueType converter, all Type-1 fonts will work with Windows out of the box.

You won't be surprised to learn there's a pronounced Internet slant to the OpenType initiative. Any users of the World Wide Web who are into fonts will know the limitations of what can be used as text on a Web page. Depending on your browser, you're usually limited to just one or two typefaces; anything else has to be embedded as a bandwidth-greedy graphic.

Adobe and Microsoft are submitting a proposal to the World Wide Web Consortium for font embedding using OpenType technology. The first benefit is the faster downloading of fonts thanks to compression technology incorporated into OpenType. The second benefit is, of course, better-looking Web pages, which is good news for everyone.

It is expected that Microsoft's Internet Explorer will support font downloading later this year. The forthcoming Adobe Acrobat 3 will probably support OpenType, as will future versions of Windows.

Next month I'll delve into the different character sets, from old-faithful ASCII, through Windows ANSI, ending up in the territory of double bytes offering up to 65,000 characters and ideal for those particularly difficult languages. Also, when is a character really a glyph? And more details on WGL4. Those who can't wait should immediately check out the source for most of my information this and next month: Microsoft's superb Web site on http://www.microsoft.com/truetype.

PCW Contacts

Let's talk DTP! Write to me at the *PCW* address on Broadwick Street or email me:
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FontWorks 0171 490 5390
Microsoft TrueType
http://www.microsoft.com/truetype

Incompatibility **blues**

Panicos Georghiades and Gabriel Jacobs deal with readers' problems with multimedia compatibility and review Corel's latest CD writing software.

"Following your recent article on the new Enhanced CD (PCW, February), I thought you might be interested in my experience of this format.

I was given the Rolling Stones CD, 'Stripped', as a present which is sold as including 'bonus video and interactive material for most multimedia computers'.

I wanted the CD for its music rather than its multimedia features, but I was nevertheless extremely disappointed when I tried to run the software and found that my PC would not even recognise the CD.

My system is a PC with a 486DX2/66 processor, 8Mb free RAM, 1,024 x 768 display in 256 colours, a quad-speed CD-ROM drive (NEC 4xIDE: your Editor's Choice *in 1995), Windows 3.1, SoundBlaster 16 Value sound card and QuickTime for Windows 2.02. The small print supplied with the CD claims it may not work with some NEC CD-ROM drives, so I decided to investigate.*

The Rolling Stones have a Web site at http://www.vmg.co.uk/stripped. Their FAQ section gives a long list of incompatible CD drives, or those reported to have problems. Seven models from various manufacturers are not compatible, and 17 out of 46 had problems. The list includes drives from Aztech, Sony, Sanyo, Philips, TEAC, NEC, Creative Labs, JVC, every manufacturer you can think of.

We're told that many of these companies make CD-ROM drives for other computer manufacturers who may put their own brand names on them. So it's possible that we may have one of these drives and not know it.

Symptoms of an incompatible CD-ROM drive are: that only the audio files are recognised; or that no files are recognised at all; or that the CD itself is not recognised; or that Windows 95 interprets the CD as being an ordinary audio CD and insists on playing it.

The literature states that this is a problem with the technology used to make the CD-ROM (I-TRAX) — not the particular CD-ROM. But that is not much help.

I feel it is important that your readers should be aware of these problems before they rush out to buy Enhanced CDs. When reviewing Enhanced CDs in future, could you detail the flavour of technology used and any known incompatibilities?"

Simon Smith

Simon, your letter raises the important issue of incompatibility, which arises from the fact that digital technology continues to move at a faster rate than the industry can cope with.

There is no satisfactory solution for the user, as something better is always just about to be released. When you've finally decided to buy something, you find that it's no longer the standard.

If anything, the situation is getting worse and Enhanced CD is a classic example. You can always tell if the industry is getting itself into a mess when the acronyms proliferate: especially when some of them mean the same thing —

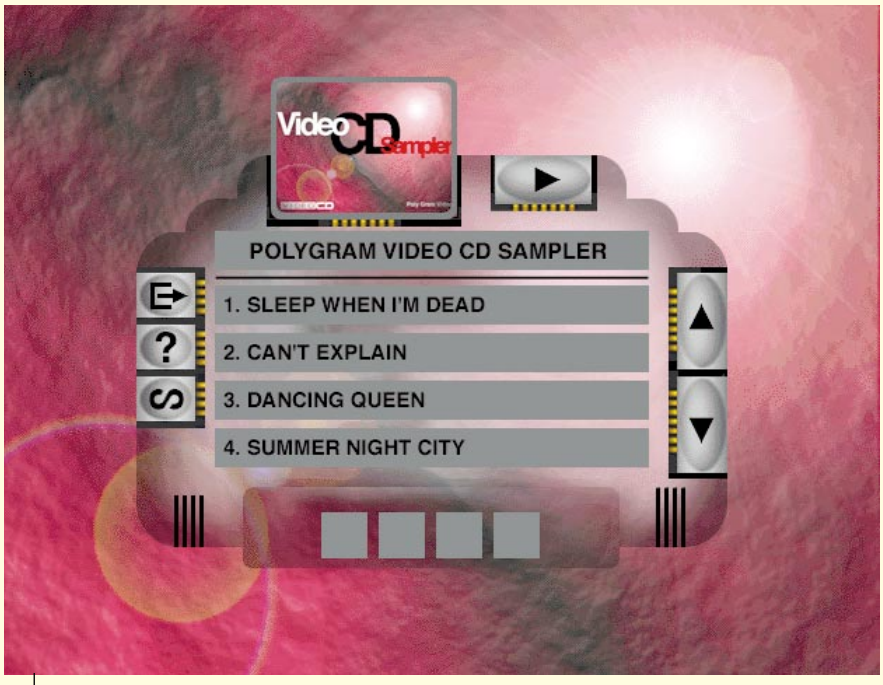


Fig 1 *Some Video CDs may have a set-up program which brings up a directory and accesses the tracks*

CD Plus, Enhanced CD, CD-Extra, CDX… Where will it end?

Video CD data

"I have a Pentium and a White Book compatible CD-ROM, plus a software MPEG player. I would like to know if an off-the-shelf Video CD would work using any software MPEG player. In other words, if you do a DIR on the CD-ROM, does it give you a file like, say, silent.mpg, or do you need special additional hardware to interpret the format of the CD? Finally, is a CD-i movie the same?"
Karl Chandler

Usually, Video CD discs include a directory which contains a file with the data (the extension is .dat), and additional directories and files which include data and programs for playing that data on various machines (PC, VCD, CD-i). This additional data normally contains lists of tracks, and even bitmap images of VCR-type controls used to play the CD.

Some Video CDs (such as the Polygram one in *Fig 1*) may include a set-up program which installs an icon in Windows, brings up a directory and accesses the tracks.

Not all MPEG playback software is the same but in theory all should be able to play back MPEG files (extensions may be .mpg, .mpv or .vbs).

So the answer is yes, you should be able to play back Video CD video data using a software MPEG player (or the Windows Media Player if your MPEG player has MCI drivers). But it may not be possible with just *any* software MPEG player.

A CD-i movie is an MPEG movie, a slightly different format from White Book MPEG, used on a Video CD. But a CD-i disc is not the same as a Video CD disc. There are discs which will work in three different machines, but there's no guarantee that you'll be able to play a CD-i version in a PC without some special hardware, despite what Philips may say.

Video CD is described in detail in the White Book specification, which defines the standard for video compression, ISO IEC 11172, better known as MPEG-1. This allows you to get more than an hour of compressed video on a CD-ROM. The audio is compressed too, and is hi-fi standard. The whole point of Video CD is cross-platform compatibility. Certain Video CDs are produced with the idea of getting the most out of particular platforms, but the video should, in theory, work on any of them if they are suitably equipped: PCs, Macs, dedicated Video CD players, and CD-i systems.

Corel CD Creator 2.0

Earlier this year, Corel released version 2 of its CD writing software. Last year, it broke the price barrier of such software by bringing out CD Creator at £169. Competitive products used to sell at between £500 and £2,500.

However, although the price of CD writers has dropped by half in the last year (from about £1,400 to about £700 or less), CD blanks have not. They're still about £5, and that's when you should buy in bulk as they're about £10 if you buy one at a time.

CD Creator 2 now includes 32-bit applications, as well as the excellent Xing CD, and has other enhancements, too. For example, it can write two new CD formats: Video CD and Enhanced CD.

For Video CD, after selecting video clips and stills, you simply designate the menu structure and away you go. Video clips need to be in MPEG-1 format but if you can only capture AVI (Video for Windows) files you can convert them to MPEG-1 with the bundled Xing CD MPEG encoding program.

Enhanced CD was previously known as CD Plus but is now usually known as CD Extra. It's a new mixed-mode CD format for putting Red Book audio (standard CD audio) and computer data on the same CD. This new standard is known as Blue Book — we'll run out of colours soon.

So far, computer data has had to go as track 1 on the disc, and this has presented problems when the disc is played on some CD players (see Simon Smith's letter, opposite). Under the new format, an ordinary CD player only "sees" the audio data, not the computer data, while a computer sees both. CD Creator also writes MS-DOS, ISO-9660 (Levels 1 and 2), and multi-session discs including Photo CDs, and it supports the new Windows 95 Microsoft Joliet filename system.

In addition, it can write standard audio discs from .WAV files or audio tracks from a CD, which it can get at digitally via your CD-ROM drive. And there's a new 32-bit utility for editing .WAV files which offers ten digital processing effects (including the removal of clicks).

The software includes many useful tools for duplicating CDs and creating CD packaging. For instance, a jewel-case editor helps you design and print transfers and inserts, and "talks" to a number of graphics programs, including Corel Draw 6. If you have the right kind of printers, you can also print onto CD blanks.

It is not at all hard to use. You just drag and drop whatever you're doing. Highly recommended.

It costs £169 (plus VAT).

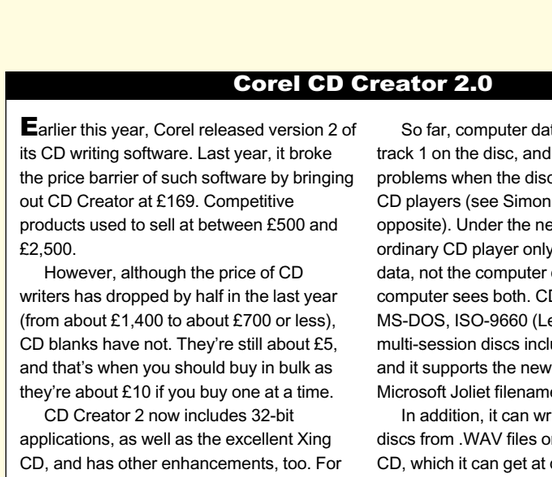


Fig 2 *Corel CD Creator can now make video CDs*

A PC or Mac must have a CD-ROM/XA (eXtended Architecture) drive and an MPEG-1 decoder in hardware or software. A dedicated Video CD player is designed to play only Video CDs. It therefore offers less flexibility and less possibility of interactivity, than is possible with a computer.

To play Video CDs, a CD-i player must be equipped with a DV (digital video) extension, which Philips supplies as a plug-in cartridge. CD-i Video CD supports up to 32 audio channels, as opposed to two on a PC or Mac, and thus allows for multi-lingual versions of titles.

So in direct answer to your question, whether or not you'll be able to access the tracks list of a Video CD is not clear-cut: not every software-based, or even hardware-based, MPEG player can do it. Most of the early MPEG software we have come across is designed to play back MPEG files rather than access Video CDs, or CD-I discs — we're back to compatibility, standards, norms, clouds of acronyms.

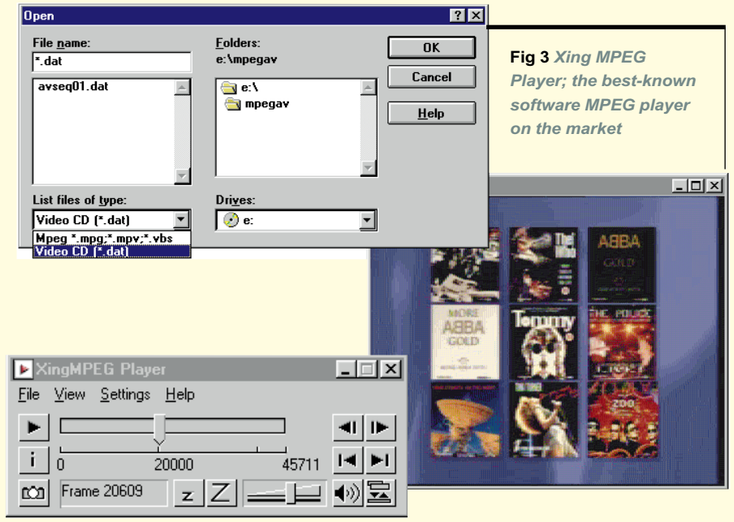


Fig 3 *Xing MPEG Player; the best-known software MPEG player on the market*

MPEG software

"I have a Packard Bell 450+ with Pentium 83MHz overdrive, 16Mb RAM, a 1Gb hard disk, Cirrus Logic graphics, a double speed CD-ROM and a Packard Bell Sound 16A card. I was wondering if I could play back MPEG Video CD using MPEG software. If so, where can I get hold of the software ?"
Jason Masters

We frequently receive letters about how to play MPEG movies. It shows just how much MPEG video material is out there.

The best software-only playback program we have seen is Xing CD MPEG Player (version 1.3, but there is an update), which works even on a 486/66 under Windows 95. It manages six frames per second (fps) at full screen, and 11fps at quarter screen, also decoding 11KHz stereo sound. The program is designed to run on a Pentium 90 and above and offers good full-screen results.

It also installs a virtual MCI driver which enables you to play MPEG files via the Media Player and other programs that use MCI. Unfortunately, we haven't seen any advertisements for it in the UK. MPEG playback software usually comes free with an increasing number of graphics cards. It may be helpful to contact Graphics Direct or Xing Technology (see our *Contacts* panel, below). You can also download free MPEG players from various sites on the Internet.

An appropriate driver

"I have an MPEG card and can play Video CDs fine from DOS, but I can only play MPEG files in Windows95 — not Video CDs. Following some experimentation, I deduced that my CD drive is obviously capable of running Video CDs, and that my Win95 driver is not. I have a Sony CDU76E-Q with a Compaq Presario CDS 772. Can you tell me where I can get an appropriate driver?"
Dermot Kehoe

You should call Sony Computer Peripherals (see our *Contacts* panel). The problem may also arise from other factors such as your MPEG playback card drivers.

PCW Contacts

If you have any multimedia-related problems or queries, email us at **g.c.jacobs@swansea.ac.uk**.
We're sorry, but we can't answer queries by personal reply — we'd be at it all day! But we're glad to publish your queries, with our answers, which we think will interest *PCW* readers generally.

Corel 01703 814142
Graphics Direct 01635 873000
Xing Technology 001 805 4730145
Sony Computer Peripherals 01932 816000

Short and sweet

Steven Helstrip rounds up a batch of simple yet essential sound and MIDI utilities.

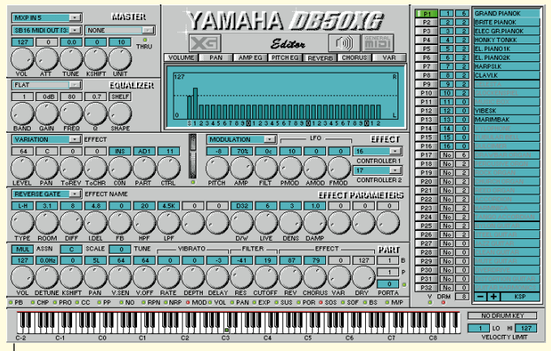
This month, we'll be taking a look at a wide range of essential sound and MIDI utilities which I have rounded up over the years. Many of the utilities covered here have been placed on this month's free, cover-mounted CD-ROM — so give them a whirl. They can be found in the sound\utils folder. First, though, I thought I'd let you know about a new, low cost digital sequencer from Voyetra.

Digital Orchestrator Plus

Orchestrator is the latest MIDI sequencer to be kitted out with audio. In addition to over 1,000 MIDI tracks, you can now record, edit and playback any number of audio tracks, limited only by your PC's processing power and disc space. I spent a few hours with it and was surprised at how quick it is to learn. The on-line help is excellent and you also get video tutorials provided on CD-ROM.

In the MIDI department, Orchestrator Plus offers all the usual editing facilities including score, piano role and grid edit pages. There are stacks of useful high-end features, too, including humanise quantise, track offsets and a larger than large SMPTE display for when your monitor has already have a PC and sound card. What makes the board so special are its effects and real-time control of sound parameters using NRPNs — that's non-registered parameter numbers to you and me.

The preset patches, or instruments, are not particularly special, but once you start to tweak them, you can create some excellent effects. As you can imagine, you need to be a MIDI wizard to program instruments from within the edit pages of a sequencer. That's where XGedit comes in.



XGedit provides a friendly interface to the XG chipset, allowing you to program interactively using knobs and sliders

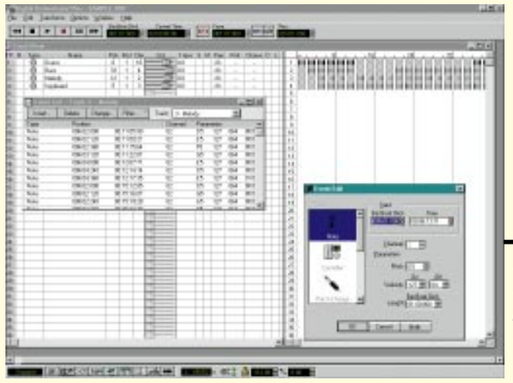
XGedit provides a user-friendly interface to the XG chipset, enabling you to access every parameter using knobs and sliders, rather than seemingly endless rows of numbers. Edits are performed and heard in real-time. You can gradually apply a filter to a bassline and slowly increase the chorus depth without hearing any glitches as the changes kick in.

Edits can be saved as standard MIDI or system exclusive files and later imported to a sequencer. Where XGedit becomes really useful, though, is when using it alongside a sequencer with a multi-client MIDI driver, such as Multimid. The registration price is £25 and you can make contact on 100270.2603@compuserve.com.

Multimid

Multimid allows up to eight MIDI applications to access a device at the same time — rather like having a toilet with eight seats. Without a multi-client driver, it is not possible to access a MIDI port simultaneously from two pieces of software. Neither is it possible to route the data output from one application to the input of another. Multimid enables you to do both of these.

The best example of Multimid doing its stuff is when you want to record the output of a synth editor, such as XGedit, to a track in your sequencer. When playing back a strings sequence, for example, you can manipulate the instrument from the editor and record your movements. Another task Multimid can take care of is routing MTC, or MIDI Time Code, between applications, enabling them to be synchronised. The current version, 1.04, is written in 16-bit code and therefore only works with Windows 3.1 MIDI drivers. Until a 32-bit version is written, Windows 95 users may find it worthwhile re-installing their old sound card drivers. Registration price is $39.95 (contact; seib@t0.or.at).



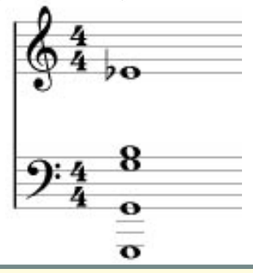
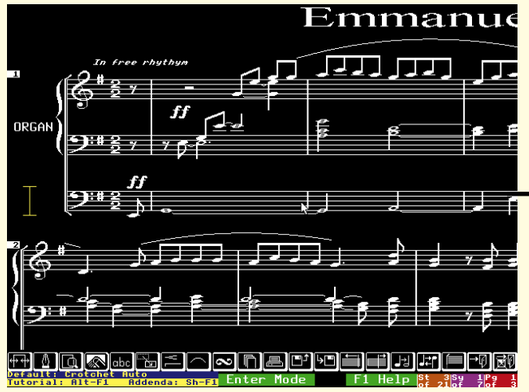
Digital Orchestrator Plus has many professional audio features

XGedit

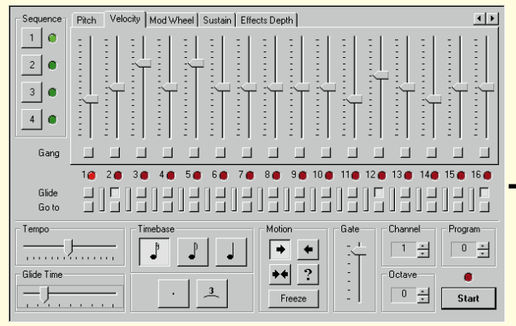
Last year, Yamaha released the DB50XG WaveTable daughterboard based on its MU80 synthesiser. At around £140, it is without doubt the best value synth, providing you to be shoved to the back of the studio.

On the audio side, Orchestrator has many professional features, from built-in effects to normalise and automated fading. Effects include digital delays, choruses, flanging, limiters and compressors. To help you on your way, the CD-ROM contains 50 MIDI drum files covering styles from swing to techno, and dozens of audio samples to use in your compositions. Digital Orchestrator Plus is available from Turnkey, price £149 (incl. VAT).

Chord of the Month

This month's triad is G aug5 (i.e. G with an augmented fifth). It's a great chord to slip in when playing 12-bar blues in the key of C, before returning to the tonic chord.



The DOS-based NoteWorthy 2



Seq-303 is an analogue-style sequencer for Windows 95

NoteWorthy 2

NoteWorthy is a low cost, easy to use DOS-based notation package. With more substantial features than your average utility, it's more of an application, really. However, from the amount of letters I receive regarding budget notation software, I though I'd include it here.

Noteworthy is best described as a DTP package for music notation since there is no support for MIDI. Don't be put off, though. The way you enter notes on a staff is very intuitive. If you want a G, for example, you press G on the keyboard. It's that easy. There's a full range of symbols, from grace-notes to *dal segno* signs, and all marks are free formatting so you can place them wherever you like. The layout tools are very comprehensive and quick to learn. Registration charge is £45 from Braeburn Software (01750 721854).

Chord Factory

This is a simple but useful utility to play and display the notes within chords on a piano keyboard. There are 20 chord extensions from which to choose (minor sixth, major seventh, and so on) and a stave to show accidentals within each key. Chords can be played through any MIDI port or sound card. The charge for registration is £25. Call Openfeature on 0181 518 6245.

Tempo-Delay Calculator

Another extremely simple, yet useful utility. It works out six different delay settings in milliseconds, given any tempo. This enables you to quickly program your digital delay unit or synthesiser to repeat (echo) at regular intervals in sync with the tempo, or speed, of the track. Registration costs $5.

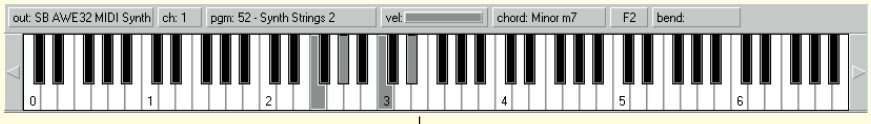
PC Dance Tools

You can probably recall being told never to judge a book by its cover. Well, I am about to amend this old maxim to include sampling CDs as well. PC Dance Tools isn't going to win any prizes for its cover design, neither will it win any prizes for its content because there aren't any up for grabs. If there were, however, this CD might just be nominated for the best all-round PC sample collection in the dance category.

There are no less than 1,200 samples practically filling this CD. Whether it's kick drums, breakbeats, vocals, bass sounds or synths, they're all on here. What's more, they are also available in various formats ready to download to whichever sound card or sampler you use. These include Digidesign's SampleCell II, AWE-32 and standard wave files for Turtle Beach cards.

All samples are arranged into categories and banked together for easy finding. Many of the instruments are also multi-sampled across different regions of the keyboard and pre-looped. As a result, the sound banks are quite large — over 1Mb in most cases. Drumkits, which include Roland's TR808 and 909 sets, are fully mapped out across the keyboard and, where possible, conform to the General MIDI layout.

At £49.95, this CD is a touch over-priced when compared to D-Zone's compilations but it may be worth the investment if you're hoping to expand your sample collection and cannot find the time to arrange and layer patches. PC Dance Tools is distributed by Time and Space (see the *Contacts* panel, below).



The MIDIKeys on-screen keyboard

Seq-303

This is an analogue-style sequencer for Windows 95 inspired, presumably, by Roland's TB-303. It allows you to create excellent sequences by setting sliders for 16 stages, or notes. You can apply *portamento*, or glide, between individual notes and set the velocity for each. All you need to use it is a sound card and a little imagination. It can be synchronised to other MIDI applications and output MIDI to any port. Seq-303 is freeware. Contact Jim Johnson at 70461.10@compuserve.com.

Dumper

Here is another short, but useful utility. It takes any Windows wave file recorded at 44KHz 16-bit mono and "dumps" it to any sampler that supports Sample MIDI Dump Standard, including most Akai, Roland and E-MU samplers. Dumper is freeware: contact 70662.1252@compuserve.com.

MIDIKeys

This is an on-screen piano keyboard that lets you play instruments from any sound source using just your mouse. It's great for checking out sounds when you can't be bothered to switch on a MIDI keyboard. MIDIKeys also plays chords. Simply select the chord type and click the root note on the keyboard. Registration will cost you the price of a postage stamp for a completed and mailed registration form: 76702.1603@compuserve.com.

Competition

As I was compiling this column, I received some email offering 50 CD-ROMs packed with AWE-32 utilities and sound banks in return for a blatant plug. So here goes. This excellent CD from High Wings Media Services contains over 100 sound banks and samples along with a sound bank editor, a demo of Cubase and a list of utilities as long as my arm.

You'll also find a handy program to digitally extract audio from CDs and a demo of Software Audio Workshop. All you have to do to win a copy is send a postcard to the address shown below. The first 50 to arrive will receive a copy absolutely free. (If you're not so lucky you can buy a copy for only £12.95).

● ***Send your post cards to: PCW Sound Utilities Competition, High Wings Media Services, Denver House, Acton Burnell, Shrewsbury, SY5 7PQ.***

PCW Contacts

If you have any MIDI-related items or general comments, send them in to the usual *PCW* address, or to **steven_helstrip@pcw.ccmail.compuserve.com**

Turnkey 0171 379 5148 (Digital Orchestrator Plus)
Time + Space 01442 870681 (PC Dance Tools)

Not just a **pretty face**

...that's Visual Developers Suite. **Tim Anderson checks it out, answers Delphi queries and solves a common Visual Basic problem.**

I do have misgivings about the hundreds of VBX and OCX controls on the market. It's not that they are no good: many are excellent and enable you to create a database manager, a web browser or a word processor in less time than it takes a C programmer to create a single "Hello world" window.

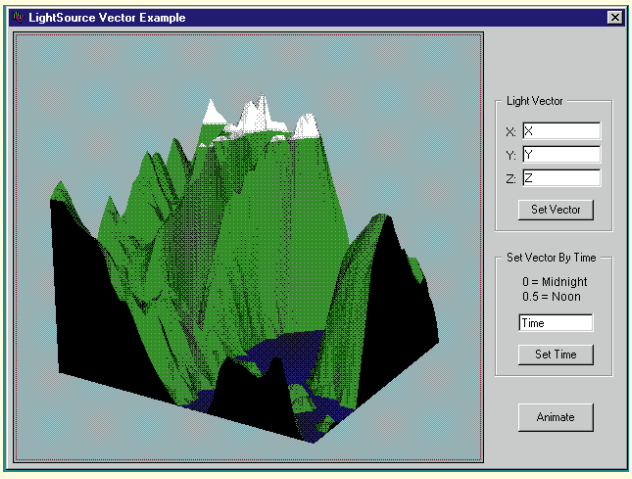
The problem is that every time you pop another component onto a Visual Basic form, your application grows more bloated and performance suffers. Canny developers will ask themselves, "Do I really need this control?" before committing to yet another OCX.

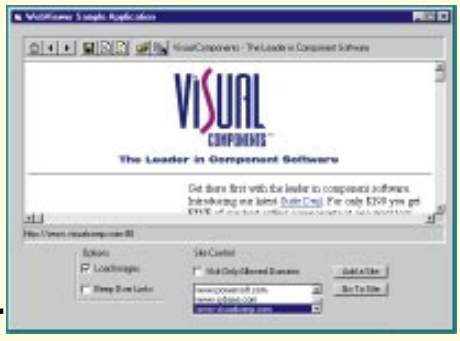
Farpoint's Tab Pro, now at version 2.0, is a case in point. Tabbed dialogues have become important in creating a clear, intuitive user interface and Tab Pro offers more than VB 4.0's native tab strip. It is supplied in every combination of 16-bit and 32-bit VBX, OCX and DLL, for use with virtually any Windows development tool.

The tab control is a container, unlike VB's tab strip which must be used in conjunction with another container like a picture box. Then there are more than 250 functions along with nearly as many properties which control the appearance of the tabs and which can look like a ring binder as well as a conventional tabbed dialogue. Tabs can be bound to a database to achieve a neat card-index style interface.

If you want a tabbed dialogue to look like a ring binder, Tab Pro is the obvious choice

Tab Pro is only around 300K and is well documented in two smart manuals. But do you really need it? Something like the Visual Developers' Suite, from Visual Components, makes better sense. No-one could accuse these controls of being merely decorative. Instead, this package includes five 16-bit and 32-bit OCX components, each of which is virtually a complete application in itself. There is the Formula One spreadsheet, First Impression charting control, Visual Speller, Visual Writer word processor control and, new in this version, WebViewer HTML control. The three most complex controls, for spreadsheet, charting and word processing, are among the best in their category.





First Impression, **(above)** *part of the Visual Developers Suite Deal, is an impressive charting component. WebViewer,* **(right)** *is new to the Visual Developers Suite but Microsoft's Internet Control Pack offers better functionality*

There are hesitations. Visual Writer is no longer indispensable now that a rich text control is part of 32-bit Windows and the WebViewer faces tough competition from Microsoft's freely-distributed Internet Control Pack. It is a shame that Visual Components has chosen to implement 16-bit OCXs, rather than the more widely supported VBX, for its 16-bit controls. But taken as a whole, the suite is excellent value and while these components will slow down your application, they also provide functionality that a VB developer could otherwise only dream about.

Do we still need Delphi?

Guy Robinson comments: "*As soon as Microsoft releases a compiler version of Visual Basic, Borland will have lost most of the advantage that Delphi currently possesses.*

With Microsoft controlling the operating system as well, Borland must ultimately lose the advantage. I found it surprising that Borland's Zack Urlocker (quoted in PCW*, May) wasn't more positive towards a cross-platform Delphi. Or is Java the company's intended cross-platform vehicle?*

I am an OS2 user, and if you talk to Mr Urlocker again you can tell him I would be one of the first to purchase Delphi for OS2 if it became available."

If you think cross-platform compatibility is important, and the rise of the Internet suggests that it is, then Java must be a more promising way forward for Borland than simply releasing versions of Delphi for other platforms. But I do not see Delphi being seriously threatened by a compiled Visual Basic. It is not just a matter of performance, it is the design and structure of Delphi that is richer and more elegant than Visual Basic. Another advantage is that Delphi is equally suitable for small utilities or major applications. VB has its own strengths, and a compiled version should address the performance issue, but Delphi will not lose its niche.

Combo Box defaults

Brendan Breen asks: "*I have a ComboBox in a dialogue. I want to set its style to DropDownList. When the dialogue is displayed I want to show a default value in the combo. But it always appears blank. I have tried all sorts of things but none of them work. Any ideas?*"

Writing to the Text or SelText property of a combobox does not work when its style is "csDropDownList". The solution is to write to the ItemIndex property. For example, you could put this into the dialogue's Show event:

```
ComboBox1.ItemIndex := 3;
```

Delphi 2.0 and OLE

Peter Harris queries Delphi's OLE capabilities: "*We are currently developing software using Borland's C++ (4.52) and OWL to develop a graphical interface to a specialised database. We were very interested in developing the front end in Delphi and purchased V2.0. However, we seem to have come across a fairly major limitation of Delphi2, in that it will not act as an OLE2 server and client. We need to be able to embed bitmaps and suchlike in our application windows, and also allow linking/embedding of our graphical stats results into other apps — specifically, word processors. We've been unable to find anything in the Delphi documentation about this. I wonder if you have come across this problem, or a way around it?*"

Delphi 2.0 will act as an OLE 2.0 server and client, but the server bits do not yet support embedding, at least not as implemented in the visual component library. On the client side, there is the TOleContainer which is to be found on the System tab of the component palette. For documentation, placing one of these on a form and then pressing F1 brings up all that Borland has seen fit to provide.

For example, you could create a link to a bitmap file with the following line of code:

Automating Delphi with OLE

Step by step, here's how to create a OLE automation server in Delphi:

1. Start a new application or DLL and save it as, for example, MYAPP.DPR. DLLs are in-process servers that run in the same address space as the calling application.

2. From Delphi's file menu, choose New and select Automation Object from the dialogue.

3. Enter a class name, for example MyObj. By default, Delphi will make the OLE class name the same as the application name, so the new OLE object will be MyApp.MyObj.

4. Choose the instancing. Internal is a rarely-used setting for OLE objects that are not available to other applications. Single instancing means that each instance of the server can only export one instance of the OLE object. Multiple instancing, which is required for DLLs, allows multiple instances of the OLE object.

5. Add OLEAuto to the uses clause in the project source. If it is a DLL, follow it with this section, observing case sensitivity:

```
exports
DllGetClassObject, DllCanUnloadNow,
DllRegisterServer,
DllUnregisterServer;
```

This is all you need. You don't need to add OLE objects and methods to the exports clause. Contrary to the documentation, you don't need to call Automation.ServerRegistration in the project source.

6. In the Automated section of the new OLE object, add the methods, properties and functions that are to be exposed, defining them in the implementation section in the normal way. There are limitations in terms of which types and declarations are allowed and normally these will be caught by the compiler if you try to use them. Here's an example type declaration:

```
type
  MyObj = class(TAutoObject)
  private
    { Private declarations }
    MyVar: integer;
    function GetMyProp: integer;
    procedure SetMyProp(iParm:
integer);
  automated
    { Automated declarations }
    function MyMethod(iParm:
integer): integer;
    property MyProp: integer read
GetMyProp write SetMyProp;
  end;
```

Note that you cannot access fields directly in an OLE object. You have to use property access methods.

7. Finally, the OLE automation object must be registered. Applications can be registered by running them with a /regserver parameter. You can register a DLL using Microsoft's REGSVR32.EXE utility, or failing that by calling the exported DllRegisterServer function. This need only be done once.

You can easily test the OLE object. Here is some example Visual Basic code:

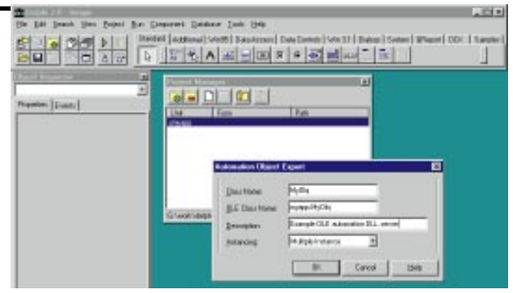
```
Dim myOLEobj As Object
Set myOLEobj =
CreateObject("myapp.myobj")
myOLEobj.myprop = 345
MsgBox "The property was set to: " &
str$(myOLEobj.myprop)
```

Why use OLE automation servers?

Performance of OLE servers is good, particularly in-process servers, but they are not as quick as standard DLLs. So why bother?

Firstly, because programming OLE objects is easy and intuitive, compared to ordinary DLLs which require case-sensitive function declarations.

Secondly, OLE objects bring with them the benefits of object-orientation, inheritance aside. Thirdly, OLE objects have a greater degree of language independence. Fourthly, as OLE progresses it should be possible to do things like remote automation using the objects you have developed.



Delphi's Automation Object Expert lets you enter the key characteristics of a new OLE automation object. Later, you have to register the object in the Windows registry

Visual Basic tip: detecting the IDE

How can you detect whether your Visual Basic application is running in the development environment or standalone? For example, you might want to enable extra debugging code when running in the IDE. Here are two ways to do it. The easy way is to use inspect App.Exename. App is a global object with several useful properties. For example, App.Path returns the directory from which the executable is run. App.Exename returns the name of the project, when running in the IDE, or the name of the executable when running standalone. If you give the project and the executable different names, then hey presto! you have an easy way to detect which is running.

If you would rather show off your Windows API skills, there is another method to use. All VB applications have a hidden parent window. In the IDE, this has a window class of ThunderMain, but in standalone executables the class is ThunderRTMain. Here's a function that exploits this difference to detect which is running:

```
' Declarations for 16-bit VB - amend for 32-bit.
Declare Function GetClassName% Lib "User" (ByVal hwnd%, ByVal lpClassName$,
ByVal nMaxCount%)
Declare Function GetWindowWord% Lib "User" (ByVal hwnd%, ByVal nIndex%)
Global Const GWW_HWNDPARENT = (-8)

Function isDev () As Integer
Dim ParentHwnd As Integer
Dim ParentClass As String
Dim iClassLen As Integer

ParentHwnd = GetWindowWord(form1.hWnd, GWW_HWNDPARENT)
ParentClass = String$(33, 32)
iClassLen = GetClassName(ParentHwnd, ParentClass, 32)
ParentClass = Left$(ParentClass, iClassLen)
If ParentClass = "ThunderMain" Then
isDev = True
Else
isDev = False
End If
End Function
```

```
OLEContainer1.CreateLinkToFile('C:\te
st.bmp',False);
```

OLE will then splutter and whir and the bitmap will be displayed. If the bitmap is later updated by another application, you can update it with:

```
OLEContainer1.UpdateObject;
```

In such a simple example, you could get similar results more efficiently using the LoadFromFile method of the picture in a standard image control, but the OLE approach has advantages. For instance, the OLE container will work with any OLE server on your system and supports things like in-place activation. You can save OLE objects to disk using TOLEContainer's SaveToStream method .

What about using Delphi as an OLE server, supplying information to display a graph or chart in a word processor document? Since this is not supported by the VCL, it is not easy to do in Delphi. The latest OWL or MFC-class libraries specifically support this OLE feature, so in this case C++ is a better option. What Delphi does support is OLE automation, so you could create an application that would supply the required data to any OLE automation client (see above; *Automating Delphi with OLE*).

If the client could also draw charts, as Microsoft Excel or Lotus WordPro can, then you could write code on the client side to extract the data and draw the graph. An insertable OLE object would be a better solution but an easy way to implement such a thing will have to wait for future versions of Delphi and Visual Basic. These will be able to create OLE controls; OLE automation objects with a visual interfa

PCW Contacts

Tim Anderson welcomes your Visual Programming comments and tips. He can be contacted at the usual *PCW* address, or at **freer@cix.compulink.co.uk** or **http://www.compulink.co.uk/~tim-anderson/**

Contemporary Software 07000 422224 (FarPoint Tab Pro 2.0; £99 plus VAT).
Visual Components 01892 834343 (Visual Developers Suite; £235 plus VAT).

Hard cheese and soft warranties

What happens when your hard disk dies and the dealer warranty bears no resemblance to the original? Stephen Rodda takes a case in point.

Hard disk failures seem to be all the rage recently. No sooner did I mention on CiX that I'd had a hard disk go West on me than I heard from many, many, more people who had experienced the same thing in the recent past. Luckily, many had had as good, or better, service than I. But unfortunately some were left holding an expensive dead dog. In the greatest majority of cases the problems turned out to be with Seagate drives.

Now, don't think I am saying anything against Seagate; as the largest supplier of hard disks, you'd expect people to have more problems with Seagate drives, purely from a statistical standpoint. The problems people were experiencing weren't to do with the fact that the disks had died, (because sometimes, this happens) — their problems were concerned with getting their warranties honoured.

Apparently, Seagate warranties the drives to their distributors — in some cases for three years. It is then the distributor who will pass on the warranty (or not) to your dealer, who in turn will pass on a warranty to you. By this time the warranty may not bear any relationship to the one which the manufacturer originally supplied. It is the dealer's duty to return the drive to its distributor, who should return the drive to the manufacturer, who will replace it, or repair it under the warranty.

What if your dealer says that the drive only had a one-year warranty (when it was advertised as having a three-year one)? Tough luck. Hard cheese. You might just as well throw the drive into the bin.

I thought that a situation like this shouldn't be left alone, so I decided to contact Seagate direct. The company's PR people gave a better response: if you find this happening to you, they say that you should contact one of the company's distributors in the country concerned (this offer is valid throughout the world) and

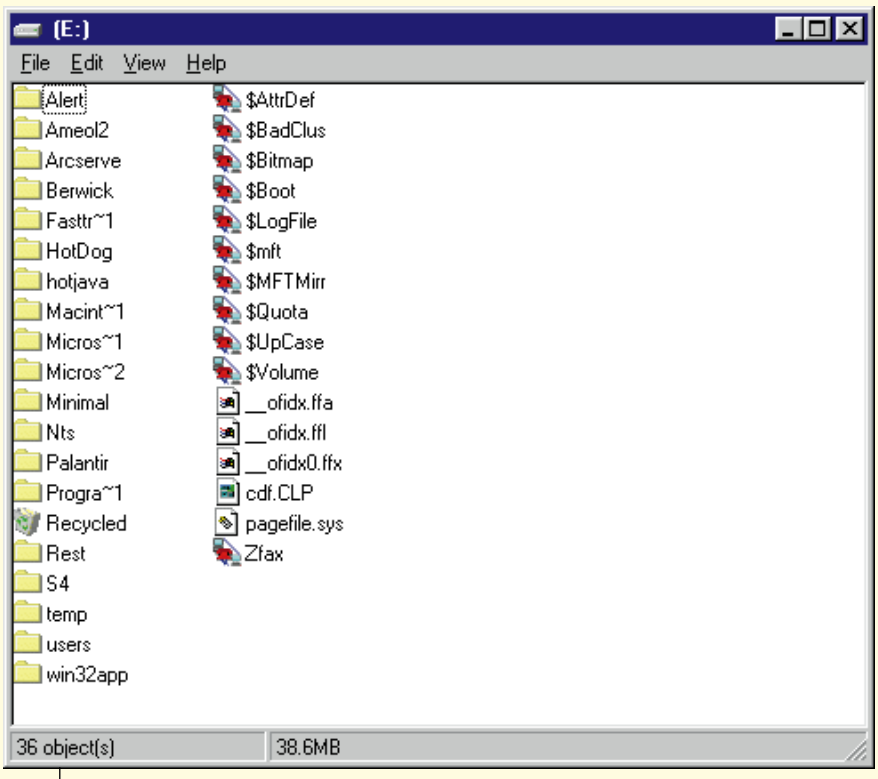


Fig 1 *Screen shot of an NTFS drive mounted under Windows 95 — notice the lack of long filename support in the 0.90 version of NTFSDOS under Windows 95*

Naughty net

The Internet is playing up at the moment. Or at least it is between the Netherlands and the UK. Goodness knows they can build something that will work even in the event of nuclear war, but it falls over as soon as British Telecom gets near it.

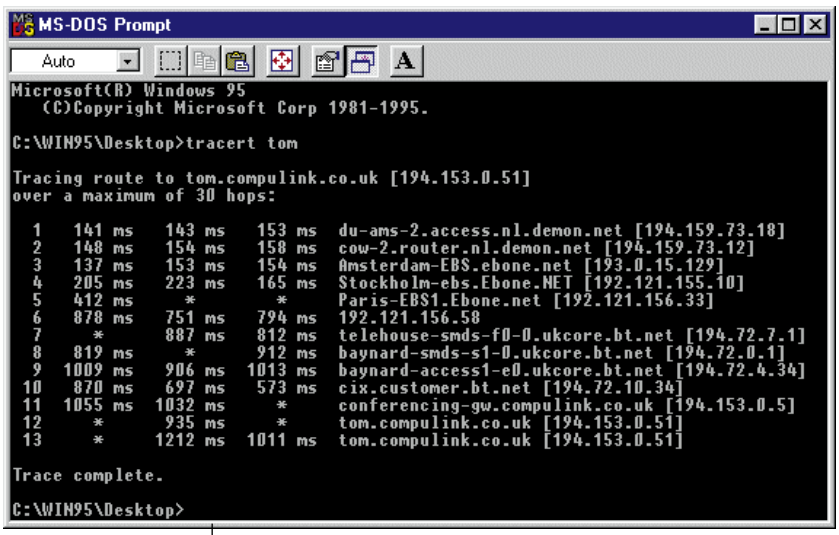
Actually, that's not quite true. British Telecom, bless its cotton socks, started it all off. Poor old Beattie seems to have been having regular attacks of amnesia during the past month or two: the *PCW* production desk has only been receiving my copy when I get tiddled off with poor Internet response and use a direct telephone line to connect and file it.

This month, the failure was due to an outfit called Ebone.net — or so I assume. It's certainly in a router in this outfit's own class C address, so I suppose it's them. I guess they neither trust it nor like it enough to give it a name (or perhaps Ebone.net doesn't want people to know it's them). The rub is that Joe Bloggs can't just mail these people and say "Hey, pull your socks up you naughty people" (or words to that effect), "I'm getting pretty ghastly traceroute figures and it's your router that's to blame". Oh, no. It doesn't work like that. Your email gets bounced, even when you send it to "postmaster", contravening the RFCs (Requests for Comment — documents which specify exactly how the Internet works, or how it should work).

Now I don't mind my packets taking 13 or 14 hops to get to Surbiton, where they used to take five or six, it's just that from my end they seem to be going from Amsterdam via Stockholm to Paris and then to the UK. I'm sure as eggs are eggs there has got to be a shorter route somewhere. Once this month, I was even getting routing via Los Angeles.

We'll soon see what's happening and if my hair survives I'm also including my traceroute output so that you can see for yourselves how dire things have become.

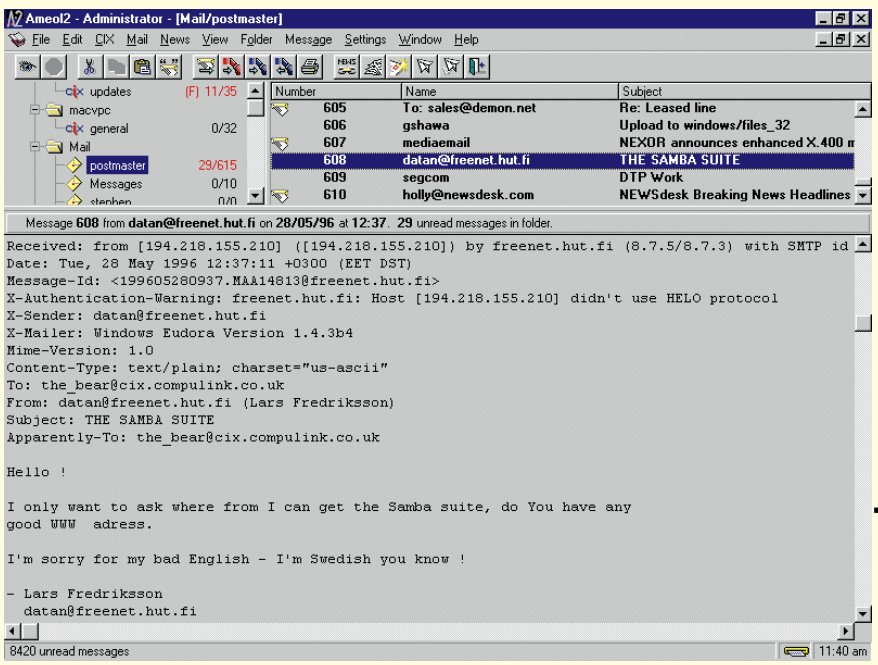
As a little update to this, it seems that when things are quieter, the router takes a more direct route. I had a little look at the routing just before I went to bed (I'm never early to bed) and at 2a.m I was actually connecting in seven hops. It looks as though someone needs to sort something out.



The Internet is crawling at the moment — or at least my bit of it is

make arrangements, direct. This is also valid if your dealer has succumbed to financial pressures and gone into liquidation. So what I thought would be a bag of rotten tomatoes becomes a bouquet! Seagate, please stand up and take a bow for looking after your customers.

With Sony, it appears that the company follows very much the same procedure. When asked, Sony said that any customers of dealers who had ceased trading should contact its national information centre for repairs or whatever might be required.



NTFS drives

Those of us who run more than one operating system (like NT and Windows 95 and Linux), will have found that there are advantages to having NTFS (and Linux) partitions in that the operating systems which own these partitions perform faster, or better, or both.

In my own case, I have an NTFS partition from which I couldn't read files when running under Windows 95 or Linux. For some time now, there has been a read-only Linux device driver which allows NTFS partitions to be added to the Linux filesystem, yet nothing for DOS-based machines. Until recently, that is. Taking the work which was done for Linux, there is now a DOS version of the work carried out by Martin Löwis for the Linux driver on ftp://ftp.ora.com/pub/examples/windows/win95.update/ntfsdos.html (also available on CiX in the windows/files.nt topic and on this month's cover-mounted CD-ROM as ntfsdos.zip). It installs as a network

Fig 2 *People often ask me about CiX. I access the service by telnet via demon in Amsterdam and currently use the CiX offline reader, Ameol, pictured here*

redirector in DOS from within the AUTOEXEC.BAT file and is then available in Win3.1 and Win95.

There is one small caveat, which is that it doesn't support long file names under Windows 95 but allows all read operations under Windows 3.11, I'm told. I removed all traces of 3.11 (I think) from my machines quite a while ago, although my colleague Jeff's Macintosh still runs Soft-Windows 3.1 it isn't suitable for the testing of a device driver giving nearly direct hardware access.

When the driver executes, it looks through all the drives on the machine and identifies those which have an NTFS format. It then mounts these as read-only, under unused drive letters. I found it to be totally foolproof in operation. I'm certainly looking forward to it being read-write and integrated with Windows 95, possibly as a service installable under the operating system proper.

See the screen shot (*Fig 1*) — under Windows 95 (you'll have to believe that it *is* Windows 95) for the details of the drive which is attached.

Problem postbag

● *"I am relatively new to the world of networking and am helping in a part time job setting up a network. I currently run three Pentium PC's using Windows 95 peer to peer networking, but need to expand.*

The final system will need to cope with around five PCs (all Pentiums with 16Mb or more), a modem for Internet (mainly email but occasional web browsing), and a variety of UNIX-based workstations (SUN, DEC and so on). I am looking at a high-end Pentium or Pentium Pro for a server but have very little idea what network system should be running on the server, Novell looks preferable as it has the lower system requirements.

The fileserver needs to be kept within a budget of £2,500 including network software. Can Novell 4.1 handle workstations based on '95, NT and UNIX or would NT be the more realistic choice? Also, can I put the modem on the server and have everything access it through there? Please help!"

Keith Rowe

Firstly, we are looking at a networking system which essentially runs the TCP/IProtocol, which you'll have to use for the UNIX-type workstations. Once we've decided which protocol is being used, we decide which transport we want to run.

Currently, there are three eligible forms of read-write filing system which run over TCP/IP: there is NFS (Sun's own — and extra under NT); FTP, in my opinion only valid for masochists; and Samba, a Lan Manager-like filing system which will run on the UNIX (and Sun and DEC) machines and allow them to connect to an NT machine which is publishing shared drives.

If you were to be running Novell Netware, you would have to pay quite a lot more for the NFS connectivity (which is also the case with NT) — in my opinion, it isn't worth it. Please also remember that the DEC machine might want to run DEC Pathworks, although there shouldn't be any problem with running Samba there, too.

Now that we've looked at the connection possibilities, what remains is the modem sharing. There are a couple of strategies which immediately spring to mind. The first is to use NT which will allow the sharing of a modem, but the modem cannot be started from any workstation; the server must explicitly request it.

Alternatively, you could look at a Linux server which would provide Samba shares which are visible to Windows machines, UNIX machines with Samba client software and so forth, and which can also share a modem over your network.

Whichever system you choose, you'll need a computer to start with, so why not begin by getting the computer and installing *PCW*'s Linux CD which was our free cover-mounted CD-ROM on the May issue? You can then determine whether you like Linux and whether you're comfortable with the operating system as a file server. If you do like it, I can guarantee that it will be stable and will out-perform most other file servers with the same specification.

● *"I'm sure you've been asked this question hundreds of times before: I have a Pentium 75MHz system with 8Mb RAM and a 1Gb HDD. I am thinking of networking this (running Win95) with a very cheap PC. I would like the second PC to be diskless, using the Pentium as a file-server. The distance between the two PCs will be about 30m.*

As I would like to keep the prices to a minimum, I am thinking of a 386SX 25 with 4Mb RAM. Would this be unbearably slow, — especially running Office Pro 95? What would be the effect on the Pentium's performance and, finally but most importantly, what is the best way to do all this?"

Alexi Margo

Windows 95 doesn't provide for remote booting and therefore a ROM in the network card would not influence the 386 to retrieve DOS code from the Pentium.

You can, however, achieve much the same effect by booting the 386 from a floppy disk containing Microsoft's DOS client software for Lan Manager and then loading the Windows software from the Pentium. The main drawback here is that you would have to provide for Windows on the 386 to perform swapping over the network.

This would, essentially, be incredibly slow. I also wouldn't dream of running Windows 3.1x in this configuration (possibly you might just get away with it if you were running a properly-tuned networking package like NT or Netware, or with a SCSI disk on the server), let alone Windows 95 on 4Mb of RAM.

I think the time has come to evaluate whether this 386 is upgradeable or not and to act accordingly, running DOS or Linux on it rather than the current, bloated, GUI operating systems and applications. Personally, I curse Office Pro 95 on a 32Mb 486-50 with 4Gb of disk space. I think you'd have to have the fire brigade in pretty regularly to peel you off the ceiling if you persisted in running that software on your hardware specification. My advice to you is to look at the 386 and see whether you can give it a motherboard transplant.

Once you have decided what to do, you can get a length of thin ethernet (it would probably work out cheaper than twisted pair) cabling and connect a couple of terminators onto the ends and then connect the machines up using a couple of networking cards.

A small point here; I would really suggest you get hold of multi-type networking cards. These seem to be available now at a very small premium and they allow you to connect them to either thin ethernet or twisted pair cabling.

● *"I've a couple of questions I'd like to put to you. But first a bit of background: I've now mastered patching and compiling Linux kernels and have patched my 1.2.8 kernel with the IP_MASQUERADING patch and have managed to get it working. FTP won't work at present but the Web does. It wasn't that difficult really.*

My questions relate mainly to Samba. I've downloaded Samba and compiled it (rather than upgrading to a 1.3 kernel). It seems to work as far as I have tested it, but it does seem to need to run over TCP/IP. Is it possible for the Linux box to talk NetBIOS over the network rather than TCP/IP?

If TCP/IP is necessary this would cause problems as my own machine jumps frequently between Linux and WfW, and when it is running WfW, the TCP/IP stacks on the other machines cause these machines to grind to a halt (obviously they can't get through to my machine via TCP). If TCP/IP is necessary, is it possible to have two winsock stacks running simultaneously, or to run one stack that can cope with two different ranges of ip addresses as my machine would need both talk to the network and to my Internet provider. Any ideas?"

Malcolm Holmes

Since getting Linux to talk NETBIOS is not feasible (well, it's possible, just like anything else, but I doubt if anyone's done it), you must use Microsoft's own TCP/IP stack for Windows in order to talk TCP/IP to Linux.

Once you've done that, you use Winsock to connect as usual. On the other hand, you could use Linux as a gateway and firewall machine — you pays your money and you takes your choice. ■

CiX is on 0171 296 6999, or you can join up without the normal £25 joining fee by setting your modem to dial 0171 296 1255 (n81), then, when asked if there is a special code, enter "friend".

PCW Contacts

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Brave new **Apple** world

Chris Cain peels back the covers on a new direction for Apple. Plus, upgrades and updates and Mac Hexen, forsooth.

It's happened. On 13th May, Apple's new CEO, Dr Gilbert Amelio, took the stage at the Mac World Wide Developers Conference to announce his plans for getting Apple back on track. The so-called "turn-around king" revealed his strategies for hardware, software and the development of key markets.

Gil Amelio is taking a slow and steady approach to getting Apple back on track

I didn't make it to the conference but it sounds as if Amelio knows what he's doing. His plans aren't earth shattering but they do appear to be exactly what the Mac market needs. Everything, from the amount of RAM shipped with machines to the Internet and Mac OS, has been addressed in what seems like a sensible fashion.

According to Amelio, from now on every Mac will come with at least 12Mb of RAM as standard. At least 16Mb would have been preferable, but 12Mb is enough to ensure new systems can run today's larger RISC-based applications comfortably and concurrently.

The next step is a 50 percent reduction in the number of Mac models over the next 12 months and a move to standardise around a core motherboard. This won't happen overnight but it should make it easier for Apple and third parties to develop more standardised software that will work across the entire line-up, including a universal version of the Mac operating system.

It's official

Copland is now officially called System 8, and it has been decided that this will definitely be a 1997 event. However, many of its key components will be released as upgrades to 7.5 as soon as they are finished, including the new Appearance Manager. It's a messy way of doing things but Apple claims it will enable the Mac OS programmers, who have been centralised in one department for the first time, to deliver a more stable product.

Amelio also stressed the importance of the Internet, saying that all future Macs would be Internet-ready. Quite what this means we don't know, as not all Macs come with modems — but you can't expect him to get everything right first time, can you?

Other Internet-related moves include the release of the Golden Master version of CyberDog 1.0, available (by the time you read this) for downloading from the company's Web sites; an agreement with Netscape to bundle a QuickTime plug-in with the upcoming Navigator 3.0 to help establish it as the standard multimedia format for the Web; and a deal with Sun to integrate its Java programming language into the Mac OS.

Due for release in July, QuickTime version 2.5 will bring multi-processor support, an improved music architecture and compatibility with M-JPEG

For more on Amelio's speech and the Apple position see this month's *Newsprint*.

QuickTime 2.5

The next version of QuickTime, Apple's software architecture for handling time-based media, will not be 2.2 as detailed a few months ago. Apparently, the company has improved QuickTime so much that it has upgraded to version 2.5 and, at the time of writing, everything looks set to arrive in July.

Among the recent enhancements are support for the Motion JPEG video file format, often used by video professionals with products like VideoVision, multi-processor support for power-hungry real-time editing and improvements to the text track which allow you to search for strings in movies. The last feature will be particularly handy for finding clips when searching for information across the Internet.

One feature that still hasn't made it into the new version is the much-trumpeted software MPEG playback. According to Jonathan Knowles, senior product manager for QuickTime, new developments in the playback engine mean that it won't be ready until the end of the year. The good news is that it will give full-motion video with 44.1KHz CD-quality sound on a 60MHz PowerMac or greater. Obviously, the more processor power you have the better, but Knowles says it will work perfectly on low-end PowerMacs. Naturally, I'll believe it when I see it.

A new version of QuickTime VR is also due, complete with programmers' API and support for speech, music, directional sound and hot spots that can be linked to URLs. Version 2.0 is expected to ship in August.

Going into Overdrive

This month, I finally got my hands on one of Apple's long-awaited processor upgrade cards. The first models are primarily designed for the 7500 and 8500, and provide you with either a 120MHz or 132MHz PowerPC604.

At first glance, the most obvious thing about the card is its enormous heat sink (*shown, right*) which completely covers the board concealing all the components. Installation is simply a matter of removing the existing processor card and firmly inserting the new one. There are no additional jumpers to tweak or software to install — simply put back the lid and away you go. The only other thing I can say about the hardware is that you should make sure the card is firmly seated in the processor socket.

I tested a 132MHz model on my 7500 and, as expected, there were instant speed improvements. The difference was specially noticeable using time-consuming filters in Photoshop and with 3D routines that make heavy use of the 604's floating-point capacity.

If you plan to make heavy use of QuickDraw 3D, now or in the future, then a 604 upgrade is a good idea. The end result is a machine that runs almost as fast as a top-of-the-line 9500, as shown by the graphs in *Fig 1*.

The 120MHz card costs £455 (plus VAT) while the 132MHz version is priced at £682 (plus VAT). These prices might seem expensive, especially when compared with PC CPU upgrades, but they are actually quite reasonable when compared with the cost of a whole new system. It's basically the equivalent of moving from a Pentium to a Pentium Pro, and you can't even do that yet.

Lurking beneath the enormous heat sink is a 604 processor running either a 120 or 132MHz

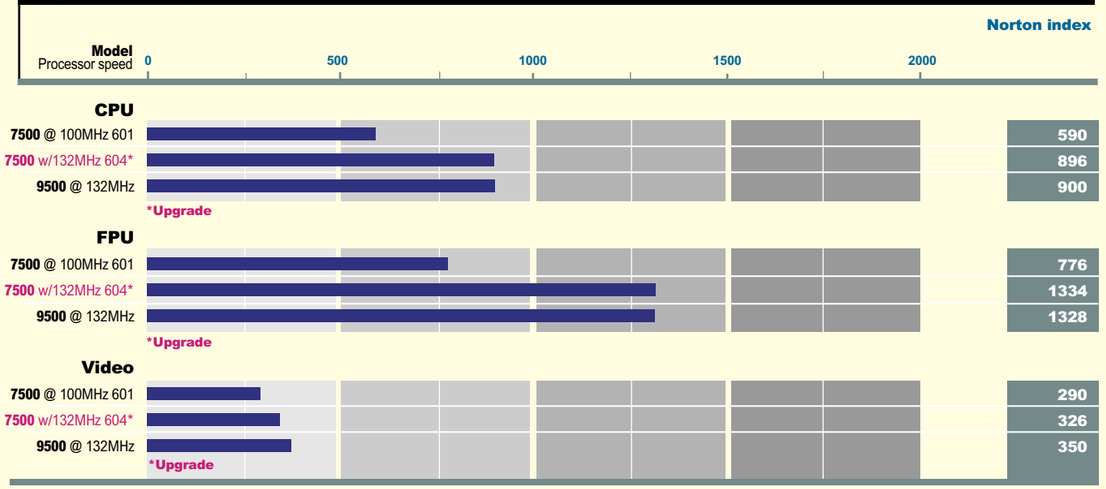
Matrox update

PCI Mac users with a Matrox Millennium graphics card will be keen to hear that a patch for the card's flash BIOS has been posted on-line. A new driver is also available and the company strongly recommends users to update for maximum performance.

The BIOS upgrade is supplied as two files — an application called FlasherMGA and an accompanying ROM image. Before running the program you need to make the BIOS editable by changing a jumper on the bottom right-hand corner of the card. Then simply run the program and follow the screen prompts.

The latest revision of driver software is version 1.1, which includes updates for both the MGA PowerDesk Control Panel and the MGA 3D accelerator.

Fig 1 — Upgrade Performance



Matrox has improved the BIOS and driver software for its PCI Millennium graphics accelerator

Take that ye Varlet!

Regular readers will know that I occasionally take time out from working to enjoy the odd game of Doom or Marathon.

This month sees the launch of the Mac version of Hexen, GT Interactive's medieval 3D romp, aka "Doom in tights". A demo has appeared on the Web, so naturally I downloaded it.

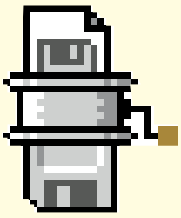
Hexen allows you to explore its 3D world as a Fighter, a Cleric or a Mage. Each character has its own special abilities and a unique style that affects the way the game develops.

For example, a Mage can use magical weapons and spells to obliterate the enemy, whereas a warrior has only his brute strength and cunning to rely on. The idea is that once you complete your quest with one character, you can do the whole thing again, slightly differently, with another character.

Graphically, Hexen is similar to Doom, except in a medieval style, but the gameplay has been engineered to be quite different. Instead of simply following on from one another, the levels are connected via a series of interlinked hubs. This has you running backwards and forwards several times because actions on one level change things on another.

Guaranteed to keep you up half the night, the Hexen demo can be downloaded from http://www.gac.edu/~bgustafs/hexen.

Utility of the month



This month's life-saving utility is Drop Disk, a tiny Apple-made application that lets you mount disk images on your desktop and access them as if they were normal floppy disks. Although unsupported by the authors, it can save you a lot of tedious work.

For the uninitiated, disk images are files that contain the complete contents of a floppy disk. They are often used as a convenient way of sending exact duplicates of disks across the Internet, or for archiving copies of floppy disks onto a hard disk. If I wanted to send someone a copy of a program that came on seven disks, for example, I could make a disk image of each one and then send them all via email. The person on the other end would then use a utility, such as Disk Copy 4.2, to copy the images to blank disks and make their own disk set.

The only disadvantage with all this is that when you want to use the files in a disk image you must have a blank floppy disk ready on which to copy them, assuming you already have a copy of Disk Copy. With Drop Disk you can simply drag the image onto the application and a couple of seconds later it appears as a mounted volume on the desktop. It can then be opened and accessed like a normal disk.

● Drop Disk can be download from various sites on the World Wide Web, including http://www.peak.org/~labquest/Dimages.html

Cry "hey, nonny nonny" and vanquish the demons infesting the world of Hexen

PCW Contacts

Chris Cain loves to hear from *PCW*'s Macintosh readers and can be contacted at the usual *PCW* address, or on-line as **chris@cix.compulink.co.uk** or **CainUK@AOL.com** or **chris_cain@pcw.ccmail.compuserve.com**

Apple Computers 0181 569 1199
GT Interactive 0171 258 3791
Matrox 01793 114444

Any **questions?**

If you have a PC problem or think you could help out other readers, contact Frank Leonhardt.

"I would be grateful if you could help me with a problem I am having with downloading files. When I download software from either the World Wide Web via Netscape 2.0, or FTP via my ISP (U-net) the speed starts at around 3K/sec and then gradually goes down to below 1K/sec. I am running Windows 95 with 16Mb RAM and always connect at 28800.

It has been mentioned that there is a problem with some Sportster modems having faulty chips causing 'spiralling death syndrome'. I have contacted US Robotics which stated that my ROM is the latest revision for the internal Sportster modems. The company advised me to use AT&F1&A3& K3S54=96. I placed this in the 'extra settings' in advanced connection settings of modem set-up but it did not rectify the problem. The 'highest speed' is set at 115200."

Chris Norton
Birmingham

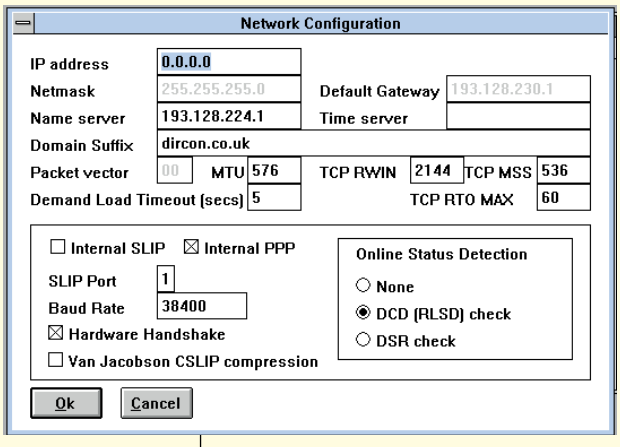
Internet connections operate in strange ways and Netscape's reported performance seldom has anything to do with the modem's operating speed. You will probably find that your system is transferring packets of data at full speed but is pausing a long time between some or all of the packets.

If you can, monitor the data transfer to and from the modem in some way. This isn't easy with internal modems (one of the reasons I prefer the external type with flashing lights), but you can sometimes examine the data using the PPP connection software. For example, users of Trumpet Winsock can select an option to monitor the raw data.

Assuming you are getting inter-packet gaps there are several possible causes. The problem could well be at the remote end where the FTP server isn't able to send your file down the line quickly enough due to the number of simultaneous users. There could also be a delay anywhere in between, caused by too many people using the same line at once.

There may be something you can do about it at your end, however. A lot of dial-up Internet connections are set up with inappropriate parameters as a default. They work with some sites and do a go-slow on others. If you have Trumpet Winsock this may well affect you.

The parameters to change are MTU from 1500 to 576, RWIN from 4096 to 2144 and TCP MSS from 1460 to 536.



TCP/IP parameters look confusing but you have to get them right

I've found that these work considerably better than the original higher values as larger packets tend to end up getting divided into smaller chunks and failing to arrive for re-assembly before they are timed-out.

Quest for speed

"I have an IBM 486SLC2 50MHz computer, with Quantum ProDrive ELS170AT 12Mb of RAM and 64K cache memory. Having checked my system with Norton's sysinfo 8.0 25E, I have the following results. Overall performance 50.1, Disk speed 7.0 and CPU speed 71.7. However, when I checked an 80486SX 25MHz computer (4Mb), the results were lower. When I played with Windows 3.1 and WordPerfect for Windows it seemed much quicker than mine. Also, I noticed that this machine has got a SCSI hard drive.

Is the answer to buy a SCSI hard drive or is my speed problem caused by other reasons? Is upgrading to 128K of cache worth the money? Secondly, I have already upgraded to 12Mb, from 4Mb. In my opinion, the only difference seemed to be that I could load multiple programs at once. My computer did not seem to be a lot quicker. Is this also due to my hard disk?"

Alfred Hamstra
Finland

I'm not generally impressed with benchmark programs, especially those which only take a few seconds to run. The results can never be taken at face value. In the real world I would expect an Intel 486SX-25 to be noticeably faster than an IBM 486SLC2-50 because the IBM chip is really a clock-doubled 386 in disguise.

Put simply, it takes more clock cycles to execute most instructions than would a proper 486SX. In an attempt to redress this imbalance, IBM has clock-doubled and tripled its 486SLC processors but Intel has also tripled theirs in the form of the 486DX4, so a wide gap still exists between the product ranges. So how does IBM justify calling it a 486? Simple, it handles the extra "486" specific instructions (albeit more slowly).

Beware other manufacturers tagging

processors as 586, which might make you believe you are getting an alternative Pentium rather than a souped-up 486. Not all non-Intel processors are below par, however, so it pays to shop around.

SCSI disks can sometimes be faster than IDE, and are the fastest disks available. However, unless your disk performance is particularly bad you will probably be disappointed if you upgrade. It would be easier, cheaper and probably faster to add a better E-IDE drive and adaptor to a machine of your class.

Twelve megabytes of RAM on a Windows 3.1 system is probably all you'll need. Having more would allow you to use more simultaneous applications, assuming that these were economical with the infamous windows "system resources". It is often the case that these run out long before the system RAM. Windows 95 likes to have 16Mb of RAM to begin with and as it doesn't suffer from the resource problem to the same extent, adding more RAM will allow you to run more programs at once. Because it is more robust than 3.1 it makes this practice less like insane recklessness, as well.

There are exceptions to the above suggestions. In particular, if you are using software which manipulates large sound or graphics files (like audio editors, video or photographs) then the more RAM you have the better.

Learning C++

"I am a student, with no experience of C or C++. I have programmed before, but to a trivial level and only in BBC Basic and Word Basic. I have several months free now, and I would like to get really stuck in to some learning in C++. I want to be able to program Windows applications. I am thinking of getting Visual C++. Is this a good option?

Of all the books I have seen, none deal with people who haven't seen C or C++ before, and none seem very specific to teaching with visual C++ in mind. Can you give me any suggestions?"

Garan Jenkin

There are several major Windows C++ compilers available, the most prominent being Microsoft Visual C++, Borland, Symantec and Watcom. Any of these would be more than adequate for someone starting out (the differences in the feature lists only come in to play when dealing with esoteric commercial development problems).

Watcom has the advantage that it can target multiple platforms like OS/2 (something which Microsoft has discontinued). Borland has been producing low-cost development tools since its inception. It has separate Windows and OS/2 compilers available with variable documentation quality. At a cost of around £70, its Turbo C++ represents good value. Microsoft C++ 4.0 is huge. It needs Windows NT or Windows 95 and loads of RAM to use, but it is the standard. For those with more modest hardware, version 1.52 is still available. This still requires 8Mb of RAM with Windows 3.1 and it has more features than you can shake a stick at for around £80 (Version 4.0 is around £400).

Symantec is my favourite at the moment, but this is based on my taste for efficiency above all else. It runs on Windows 3.1 and upwards, with both 16-bit and 32-bit versions of the compiler, which can target either platform. In other words, you can develop for Windows NT using a compiler running on 3.1. Its documentation is good, but it does cost around £400.

If I had a free choice (which I do) I'd plump for Symantec for day-to-day use, with Microsoft on the shelf for when compatibility was all-important. With a budget to consider, Turbo C++ or Microsoft VC++ 1.52 are good choices.

Books are more of a problem. The "C" compilers mentioned come with plenty of example programs but these can be heavy going for beginners. Your best policy would be to look at as many as possible and pick one you personally find easy to understand.

Once you are past the absolute beginners stage, the "bible" of C++ is The C++ Programming Language *by Bjarne Stroustrup (the language's inventor). This is also available in an annotated version, and is divided into a tutorial and a reference section (though it does proceed quickly).*

Frank's Bargain Basement

IDE, the most popular interface for connecting hard disks to PCs, was described as the "poor man's SCSI" when it first appeared. Like SCSI, it moved the drive controller electronics from the PC to the drive itself, allowing the use of longer connecting cables and faster transfer rates. The older system of ST-506 was limited in speed because it sent raw and vulnerable data from the drive, along a cable to the controller.

But why should IDE (which stands for Integrated Drive Electronics) still be so much cheaper than SCSI after all these years of integration and volume sales? The best reason I can think of is that SCSI adaptor and drive manufacturers like having a higher margin than would be possible in the cut-throat IDE market.

SCSI does have its advantages in high-end applications, although speed is no longer one of them with the arrival of E-IDE. A SCSI bus can have up to seven peripherals on it and each peripheral can consist of more than one disk drive (though this feature is now rarely used).

E-IDE supports a maximum of four drives. You may have noticed SCSI drives are available with far greater capacities than E-IDE, too — the only reason for this can be profit margin protection.

Then, along comes Iomega and gives the game away. Its SCSI ZIP drive has a Macintosh-style SCSI connector on it which makes it difficult to sell it to PC users. So what did Iomega do? They started selling their own Adaptec-compatible SCSI adaptor for just £35. It has a Macintosh (25-Way D) socket on it, though you can plug in a Mac-to-PC cable if necessary. Apart from this, its just a cheap-and-cheerful SCSI adaptor which would be ideal for normal hard disks, scanners, CD-ROM drives, tape streamers and other exotic storage devices.

Low-end SCSI adaptors from other sources are bound to be pushed down in price eventually, but whether or not you're planning to use a ZIP drive this board has to be a bargain. And for anyone with Macintosh peripherals they wish to use with a PC from time to time, it's the perfect answer.

PCW Contacts

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Computer Answers Web site at **http://www.users.dircon.co.uk/~wombat/answers/**.
Letters may be sent to *PCW* at **VNU House, 32-34 Broadwick Street, London W1A 2HG**. Sorry, but due to the high volume of correspondence, individual replies are not normally possible.

The C++ Programming Language by Bjarne Stroustrup. Addison-Wesley. ISBN 0-201-12078-X
Grey Matter ("C++" Compilers) 01364 654100
Iomega (Zip Zoom card) 0800 898563 (from UK); or ++35 318 007 5133: or www.iomega.com

Sound principles

Eleanor Turton-Hill explains how to make the most of the sound-making capabilities of your PC.

These days, most PCs come with a sound card pre-installed but very few people fully exploit the sound capability of their machines.

Sound cards don't only make games and multimedia applications sound great but with the right software you can also compose, edit and print your own music as well as learn to play the piano, record and edit digital audio, and play audio CDs from your desktop.

Before you start fiddling with your recording software, however, it helps to understand some of the underlying principles of sound generation on PCs. Here, I've given a brief summary of the most important technical concepts relating to sound.

Why does a PC need a sound card?

Sound is a relatively new capability for PCs because no-one really thought about it when the PC was first designed. The original IBM-compatible PC was designed as a business tool, not as a multimedia machine, so it's hardly surprising that nobody thought of including a dedicated sound chip in its architecture. Computers, after all, were seen as calculating machines; the only kind of sound necessary was the beep that served as a warning signal.

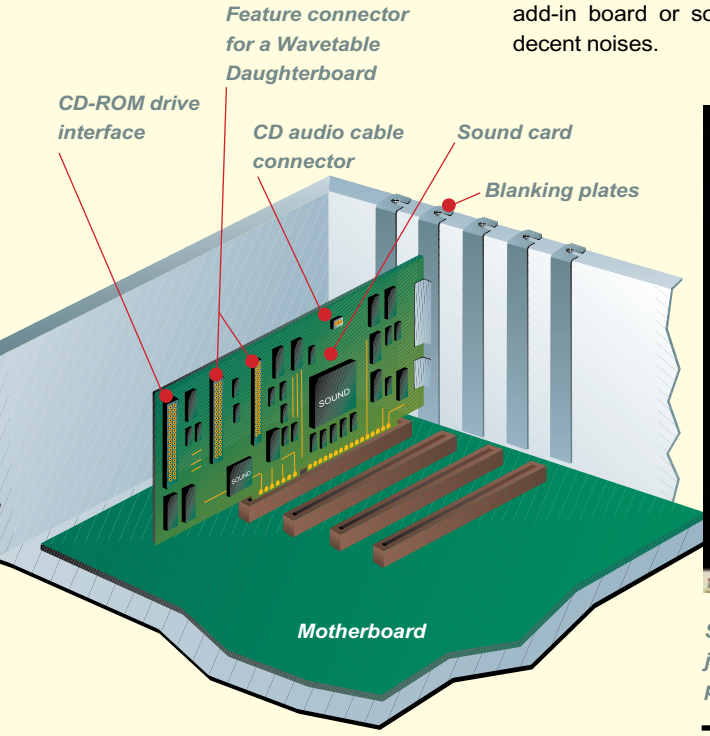
For years, the Macintosh has had built-in sound capabilities far beyond the realms of beeps and clicks, but PCs with integrated sound are still few and far between. That's why PCs continue to require an add-in board or sound card to produce decent noises.

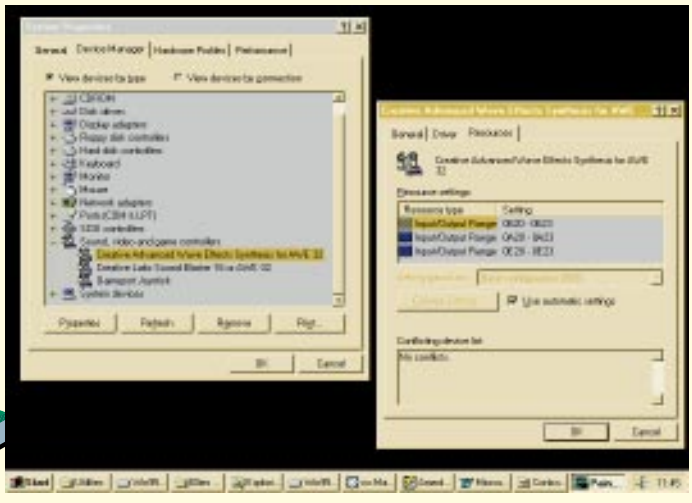
The popularity of multimedia applications over the past few years has accelerated the development of the sound card, and the increased competition between manufacturers has led to these devices becoming cheaper and more sophisticated.

Sound cards can cost from as little as £30 to as much as £300. Most modern boards now use WaveTable technology which uses sampled sounds of real instruments. WaveTable has greatly improved the quality of sound available on a PC compared to the synthesised sounds of a few years ago. Digital Signal Processing (DSP) technology is becoming more widespread on sound cards and this allows reverb, delay, and other digital effects to be applied to instruments or samples.

What is Plug and Play?

Plug and Play is a standard introduced by Microsoft in its latest operating system, Windows 95. Essentially, Plug and Play was introduced to make the installation of new devices easier by automating the whole process. Windows 95 includes drivers for a large number of sound cards and should automatically detect Plug and Play cards when they are installed.





Sound cards which conform to the Plug and Play standard have only just started to appear on the market. Those which live up to their promises should install automatically and report no conflicts

WaveTable daughterboards

If you're thinking of improving the sound capability of your PC, check your existing sound card first to see if it has a feature connector. If it does, then you could save some money by upgrading the card with a WaveTable daughterboard.

WaveTable daughterboards are compatible with any 16-bit sound card that has a feature connector. The connector is easy to find and will be located at the bottom left-hand side of the card near to the blanking plate. It looks similar to a CD-ROM interface, only smaller. Some cards, including the Value edition of the SoundBlaster 16, may not have this connector, so check first.

Installing a WaveTable daughterboard couldn't be easier. Simply remove your sound card and "sit" the daughterboard on top, making sure the connectors are firmly attached. Three plastic spacers will also be provided which prevent the two cards from damaging each other.

The most interesting thing about this type of upgrade is that you don't have to install any software for it to work and there are no dip switches to configure. If you want the daughterboard to be the default synthesiser in Windows, which is likely, you will need to edit the MIDI mapper, or MIDI output port if you're using Windows 95. This is straightforward and is explained in the accompanying manuals.

The quality of the instruments on each WaveTable daughterboard vary significantly. This is usually determined by how much ROM the card has. Most cards contain between 1Mb and 4Mb of samples and offer digital effects which include reverb, chorus and delay. Reverb gives the impression that the instruments are being played in large halls or churches, which is great for when you're playing Doom. When chorus is applied, the sound is similar to many instruments playing at once when only one is actually being used. Delay is just a posh word for echo.

The operating system reads your Config.sys and System.ini files and scans for existing drivers on installation. If the card's drivers are pre-bundled with the operating system, they'll be installed and configured for you. If not, you'll be prompted for an installation disk.

Sound cards which aren't Plug and Play-compatible must be installed manually using the Add New Hardware Wizard in Windows 95. As with many new Plug and Play devices, the "seamless integration" concept does not always work in practice; often, cards which claim to conform to the Plug and Play standard don't install smoothly.

WaveTable synthesis

WaveTable cards play back pre-recorded samples of real instruments. A WaveTable ROM, therefore, is an electronic table of waveforms. Whereas one FM sound card will sound much the same as the next, WaveTable cards differ significantly in quality. The quality of a card's instruments is determined by several factors: the quality of the original recording of each instrument; the sampling rate, or frequency, of the recordings; the number of samples used to reproduce each instrument; and the compression methods used to store the samples.

By using high ratio compression techniques, more samples (or instruments) can be "squeezed" into small amounts of ROM. There is a trade off with quality, however, as compression often results in loss of dynamic range and quality.

Every instrument produces subtly different timbres depending on how it is played. For example, when a piano is played softly, you don't hear the hammers hitting the strings. When it's played harder, not only does this become more apparent, but there are also changes in tone.

Many samples and variations have to be recorded for each instrument to recreate this range of sound accurately with a synthesiser. Inevitably, more samples require more ROM. A typical sound card may contain up to 700 instrument samples within 4Mb ROM. To accurately reproduce a piano sound alone, however, you're looking at between 6Mb and 10Mb of data. This is why there is no comparison between the synthesised sound and the real thing.

Digital signal processors

Digital effects can dramatically improve the overall quality of sound cards. Digital Signal Processors (DSPs) use complex algorithms to add reverb and other effects to give the impression that instruments are being played in large concert halls. Other popular effects include stereo choruses and delays.

Adding a stereo delay to a guitar part can "thicken" the texture and give it a spacious stereo presence. Chorus is also used to thicken instruments and gives the impression that many instruments are playing when, in fact, only one is being used.

What is MIDI?

MIDI stands for Musical Instrument Digital Interface. It was developed as a communications protocol so musical instruments could "talk" to each other. MIDI was first developed to allow keyboard players to "layer" the sounds produced by several synthesisers, although today MIDI is used mainly for sequencing. A sequencer is a piece of software that records and plays back MIDI information. It allows complex musical arrangements to be built up that would otherwise be impossible for one person alone to play.

MIDI doesn't transmit any sound, just simple binary information. The ones and zeros that are sent down the cables contain very specific instructions. The most common instructions tell the receiving instrument to play a particular note for a duration of time — a note-on message followed by a note-off message. The same instructions contain details of how loud to play that note.

The synthesiser knows which sound to play using a simple program change message. This message tells the synthesiser to select sound number 67, for example, which in the General MIDI specification is a saxophone. Before General MIDI came into effect, sequences containing program change messages were meaningless if played back on an instrument other than the one on which it was recorded. This was because program 3 on the original synthesiser may have been a piano, while on another synthesiser it may have been a trombone. The result is a tune that sounds nothing like the composer intended.

In much the same way as you can have seven SCSI devices in a chain, MIDI communicates over 16 channels allowing up to 16 MIDI instruments to be played from only one interface. Since the majority of sound cards are multi-timbral, 16 instruments can be played simultaneously from only one device. Adding a second MIDI interface opens up another 16 MIDI channels. Some MIDI interfaces offer as many as 16 outputs, making it possible to access 256 at the same time. This might sound ridiculous, but in large MIDI setups you can easily run short of channels.

PCW Contacts

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response times?
• Check the technical support. Is it free? Is it easy to get through to?

PCW Minimum Specification

This is the absolute minimum spec we think you should even consider buying now. It's suitable for general business use: word processing, databases and spreadsheets.
• Windows 3.11
• 486 DX4 100 MHz processor
• 8Mb RAM
• Graphics card with 1Mb of memory
• 540Mb hard disk
• 3.5in floppy disk drive
• Double-speed CD-ROM drive
• 14in colour monitor
• PCI local bus

If you're buying the PC for home use, you'll probably want full multimedia capabilities so that you can use CD-ROM games and edutainment products and play video clips. This should include at least a
• 16-bit SoundBlaster-compatible sound card
• Speakers

PCW Recommended Specification

If you're not completely strapped for cash this is the PC specification we recommend. No-one who works at *PCW* would settle for less.
• Windows 95
• Pentium 90MHz or 120MHz processor (a faster processor will make your computer run more quickly and smoothly)
• 256Kb secondary cache (again this makes your computer run faster)
• 16Mb EDO RAM. 16Mb of memory speeds your PC up a lot, particularly if you're multitasking (using more than one application simultaneously)
• Graphics card with 2Mb of memory
• 1Gb hard disk — modern computer software takes up a lot of space
• 3.5in floppy disk drive
• Six-speed CD-ROM drive (video clips will play more smoothly; you will be able to access files on CD-ROM disks more quickly)
• 15in colour monitor (one inch doesn't sound a lot, but is easier on the eyes)
• 16-bit SoundBlaster-compatible sound card
• Speakers
• PCI local bus

For up-to-date PC reviews, see our May '96 cover story

Buying a PC

The one universal rule is that PCs get cheaper, better and faster all the time. The result is that your state-of-the-art PC can become outdated and old-fashioned in a couple of years. It may still work perfectly well, but it probably won't run very fast and won't run the latest software. If you're just planning to do simple word processing, this may not matter. But we're assuming here that you want to buy a general-purpose multimedia PC that can play games, use CD-ROMs and run a range of modern software.

Things not to do when buying

• Don't buy a machine with less than 16Mb of memory if you plan to run Windows 95.
• Make sure Pentium motherboards have an Intel Triton chipset.
• Avoid cheap 14in monitors.

Things to do when buying

• You can never have too much disk space. Spend extra cash on the next hard disk size up.
• Memory is expensive, but extra memory often makes more difference than a faster processor.
• Look at the bundle. What other software is included — is it worth having?
• Check the warranty. Is it for on-site or back to base repairs? If it's on-site, does the manufacturer offer guaranteed

PCW Best Specification

Our Best Spec is as good a PC as you are likely to need for most software. For some specialist applications, like professional DTP or CAD, you may need to add even more memory, a bigger hard disk, a more powerful graphics card, or a larger monitor.
• Windows 95
• Pentium 166MHz PC
• 512Kb secondary cache
• 32Mb EDO memory
• 2Gb hard disk
• 3.5in floppy disk drive
• Eight-speed CD-ROM drive
• 17in colour monitor
• 2Mb VRAM graphics card (this means your graphics card can display more colours and a higher resolution on your monitor — 16 million colours at a resolution of 800 x 600, to be exact)
• 32-bit sound card
• Quality speakers
• PCI local bus

Other things to consider

PCs have become a lot more similar in the last few years. The days when smallish computer companies designed their own chipsets (the computer chips that assist the computer's main processor) are long gone. Most small box-shifters buy their motherboards from Taiwanese manufacturers. Larger companies either design their motherboards themselves (Apricot, Compaq, IBM) or get motherboards built by other companies to their specifications (Gateway).

Buying a NOTEBOOK

Notebooks are one area in which it's often safer to stick to brand names. Not that some of the Far Eastern kit doesn't work perfectly well, but reliability does seem to be a problem and it can be fiendishly difficult to obtain spares. The other useful guideline for notebooks is t try before you buy.

Standard notebook specifications are generally a step or two behind the desktop equivalents. For example, quad-speed CD-ROM drives are still no standard on notebooks, whereas on desktops the six-speed variety is alread well established. The latest generation of colour screens can cope with 800 x 600 resolution, but that's still a step behind the desktop 1,024 x 768 standard.

What to look for in a notebook

• **Pointing device** There's been a wholesale move from trackballs to trackpads. Some notebooks, notably IBM Thinkpads, use stick technology (a device which looks like the rubber on top of a pencil and is controlled using one finger).
• **CD-ROM** drives are rapidly becoming standard in notebooks. If your notebook is going to be your only machine, it's worth getting one.
• **Floppy disk drive** Often there's a choice between a CD-ROM drive and a floppy disk drive. Again, if the notebook is to be your only machine, specify both. Otherwise, reinstalling an operating system can mean returning the machine to the manufacturer.
• **PC cards** Modern notebooks all have at least one PC card slot. They take credit-card sized expansion cards which can add a fax-modem, a network interface card or even an extra hard disk to your computer.
• **Battery life** Battery technology keeps improving, but unfortunately the power demands of ever more powerful notebooks tend to keep pace. Battery life varies from as little as 30 minutes to over six hours. Lithium Ion and Nickel Metal Hydride batteries have now largely replaced the older Nicad (Nickel Cadmium) batteries.
• **TFT screens** TFT or active matrix screens are starting to replace the slower dual-scan or passive matrix screens. It means the screen image is refreshed much more quickly.
• **Warranty** Drop a notebook and it may well break, so it is especially vital to check the terms of your warranty. How long is it? What level of service is provided?

PCW Minimum Specification

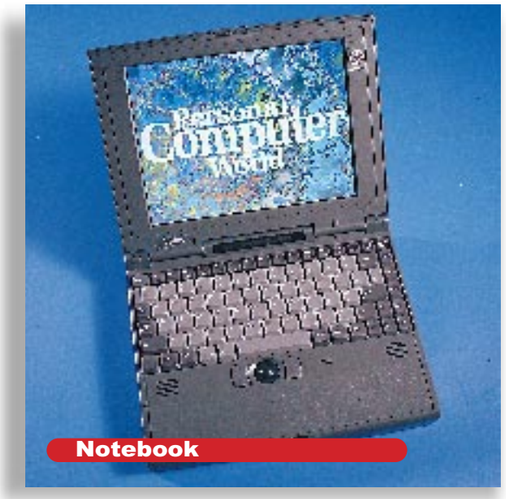
Notebooks change rapidly. It's often possible to pick up end-of-line machines with 486 processors from brand-name manufacturers such as Toshiba and Compaq at discounted prices of £1,000 or less. These can be a very good buy. Just make sure they can run the software you need to use. They probably aren't up to running Windows 95.

PCW Recommended Specification

• Windows 95
• Pentium
• 256Kb secondary cache
• 16Mb RAM
• On-board graphics with 1Mb of memory, PCI local bus
• 500Mb hard disk
• 3.5in floppy disk drive and/or dual-speed CD-ROM drive.
• Dual-scan screen.

PCW Best Specification

The state of the art notebook. You're either loaded, or your company's picking up the tab.
• Windows 95 or Windows 3.11
• Pentium
• 256Kb secondary cache
• 16Mb RAM
• On-board graphics with 2Mb of VRAM memory, PCI local bus
• 1Gb hard disk
• 3.5in floppy disk drive
• Quad-speed CD-ROM drive
• Active matrix TFT screen
• Long battery life



For recent notebook reviews, see PCW March '96, page 103

GLOSSARY OF COMPUTING: IMPORTANT TERMS AND ACRONYMS

A

Access Time
The time it takes for a device to access data. The access time, quoted in milliseconds (ms) for hard disks and nanoseconds (ns) for memory, is usually an average, as it can vary greatly. Together with the transfer rate, it is used to gauge the performance of hard disks and other devices. The lower the number, the better the performance.

Acronyms
These form most of the technobabble which has been refined over many years to confuse you, the user, and keep us, the writers, in business. Try to take as little notice as possible of it: the computer industry is littered with TLAs (Three-Letter Acronyms).

Applications
An application, or package, is one or more programs used for a particular task: for example, word processing, invoicing or spreadsheeting. Applications are bought shrink-wrapped (wrapped in cellophane for general use) or custom-built for more specific uses.

ASCII (American Standard Code for Information Interchange)
Usually a synonym for plain text without any formatting (eg italics, bold or hidden text). Since computers naturally use binary rather than Roman characters, text has to be converted into binary for the processor to understand it. ASCII assigns binary values to Roman characters. RTF, a Microsoft standard, adds extra formatting features to plain ASCII.

B

Backwards compatible
Compatibility of hardware or software to older versions of the product or standard.

Baud rate
The amount of data that can be sent along a communications channel every second. In common usage, it is often confused with bits per second. These days modem speeds are normally measured in bits per second. (See V* and Bit)

BIOS
Basic Input/Output System (pronounced buy-oss). Software routines that let your computer address other devices like the keyboard, monitor and disk drives.

Bit
Binary digit, the basic binary unit for storing data. It can either be 0 or 1. A Kilobit (kbit) is 2^{10}, 1,024 bits; and a Megabit is 2^{20}, which is just over a million bits. These units are often used for data transmission. For data storage, Megabytes are more generally used. A Megabyte (Mb) is 1,024 kilobytes (Kb) and a Kb is 1,024 bytes. A Gigabyte (Gb) is 1,024 Mb. A byte (binary digit eight) is composed of eight bits.

Bug (See Crash)

Boot
Short for bootstrap. Refers to the process when a computer loads its operating system into memory. Reboot means to restart your computer after a crash, either with a warm reboot (where you press Ctrl Alt Del) or a cold reboot, where you switch the computer off and back on again.

Bulletin board systems (BBSs)
A kind of electronic forum now being replaced by the Internet. (See *net.newbies*, p211)

Bus
A "data highway", which transports data from the processor to whatever component it wants to talk to. There are many different kinds of bus, including ISA, EISA, MCA, and local bus (PCI and VL-bus).

C

Cache (See Memory)

COAST
Cache On A Stick.

CD-ROM
A CD-ROM is the same as a normal audio CD, except it can store data as well as sounds. A CD-ROM player can be attached to your computer to read information from the CD-ROM into the computer's memory in the same way that a domestic CD player reads information from the CD into your hi-fi. The advantage of distributing information on CD-ROM rather than other media is that each one can hold up to 680Mb of data — equivalent to some 485 high-density 3.5in floppy disks. The disadvantage, however, is that you can only write once on CD-ROMs, but this makes them ideal for archiving.

CISC (See **RISC**)

CPU
Central processing unit. Normally

refers to the main processor or chip inside a PC. (See Processor)

Crash
Common term for when your computer freezes. Can be caused by a power surge, a bug (which is a fault in software), or a GPF.

D

DRAM (See Memory)

DOS (Disk Operating System)
Once the standard operating system for PCs, it is now being replaced by Windows 95 and Windows NT.

DPI (Dots Per Inch)
Common measure of the resolution on a printer, a scanner or a display.

Drive controller card
An expansion card that interprets commands between the processor and the disk drives.

Drivers
Pieces of software that "drive" a peripheral. They interpret between the computer and a device such as a CD-ROM. If you have a SCSI CD-ROM drive connected, you will be able to use it on a PC or a Mac, just by loading up the relevant driver on each machine.

E

EIDE (See IDE)

EISA (Extended Industry Standard Architecture)
A bus standard designed to compete with MCA now being replaced by PCI. Its advantage was that it was designed to be backwards compatible with the now-ancient but still dominant ISA interface (as the name implies).

Electronic mail (E-mail, email)
(See *net.newbies*, p211)

Expansion card
Circuit boards that fit inside PCs to provide extra functionality. For example, one might be an internal modem, providing the same functions as an external one (which is more common) but sitting inside the PC. Expansion cards are designed to be fitted and removed by people with little knowledge of PCs.

F

Floppy disk drive
Practically all PCs come with a floppy disk drive. 3.5in HD (high density) 1.44Mb floppy disks are now the standard. They come in hard plastic cases and have replaced the older, literally floppy 5.25in disks.

Fonts
A font is an alphabet designed in a particular style. Fonts apply to both screen and printed letters. Modern TrueType and Type 1 fonts are stored as shape descriptions, scalable to any size.

Format
To wipe a floppy or hard disk in order to prepare it to accept data.

GPF
General protection fault.

Graphics Card
An expansion card that interprets commands from the processor to the monitor. If you want a better, higher-resolution picture or more than your existing setup, you'll need to change your graphics card and/or your monitor.

GUI (Graphical User Interface)
(See Windows)

H

Hard disk
Sometimes called a fixed disk, hard disks are hermetically-sealed rigid disks able to store data and programs. Disk capacities increase all the time. The standard is now 1Gb, but disks of up to 9Gb are available.

Hardware
All electronic components of a computer system, including peripherals, circuit boards and input/output devices.

HTML (Hypertext mark-up language)
The standard language used in the creation of World Wide Web pages.

I

IBM-compatible
Originally meant any PC compatible with DOS. Now tends to mean any PC with an Intel or compatible processor capable of running DOS or Windows.

Internet
(See *net.newbies*, p211)

IDE
Integrated drive electronics. A control system designed to allow computer and device to communicate. Once the standard for PC hard disks, now being replaced by EIDE (enhanced IDE) which offers improved performance and extra features. EIDE can support four external devices including hard disks and CD-ROM drives.

IRDA
Infra Red Data Association — standard for exchanging data using infra-red typically from PDAs or notebooks to a PC or printer.

ISA (Industry Standard Architecture)
This was the original bus architecture on 286 PCs. Also known as the AT bus (the 286 was known as the AT), it is still in use today. Slow by modern standards, but so widely accepted that expansion cards are still made for it. (See EISA, PCI)

ISDN Integrated Services Digital Network
A digital voice and data telephone network which looks set to replace the current analogue one. ISDN adaptors are already starting to replace modems as a fast way of accessing the Internet and transferring data.

JPEG (See MPEG)

Kbit (kilobit), Kb (kilobyte)
(See Bit)

L

LAN (Local Area Network)
(See Network)

Local Bus
PCI (Peripheral Component Interconnect), developed by Intel, is now the standard for local bus architecture. It is faster than the older VL-Bus (Video Electronic Standards Association local bus) it has now largely replaced.

M

Macintosh (Mac)
A type of personal computer, made by Apple, that is incompatible with PCs. Developed as a rival standard, its operating system looks like Windows, except that it predates it and (in many people's view) looks and works much better.

Maths co-processor
A specialised chip that handles mathematical calculations (floating point operations) for the processor. Modern processors such as the Pentium have a co-processor built into them.

Mbit (megabit) (See Bit)

Mb (Megabyte) (See Bit)

MCA
A kind of bus designed by IBM to beat EISA. Although faster, it never became popular because every machine that used it had to pay a royalty to IBM, and because it was not backwards-compatible with ISA.

MPEG (Moving Picture Expert Group)
A standard for compressing video available in several flavours: MPEG 1, MPEG 2 and MPEG 4. JPEG (Joint Photographic Expert Group) is a standard for still image compression.

Memory
The term normally refers to RAM (Random Access Memory). This is the kind that disappears whenever you turn your computer off and is much faster to access than a hard disk. It acts as a kind of staging post between your computer's hard disk and its main processor.

•DRAM Dynamic Random Access Memory
This requires its contents to be replaced every 1/1000th of a second and is the most common form of memory in PCs.

•SRAM StaticRAM
Retains memory until the power is switched off.

•VRAM VideoRAM
Faster than DRAM, this is used by graphics cards.

•EDO Extended Data Out RAM
The latest type of memory, offers improved performance.

Cache memory
Temporary memory set aside to store the information that is accessed most frequently. The Pentium processor has 8Kb of cache built in. This can be further speeded up by a secondary cache, typically 256Kb. Part of your DRAM is also often used to cache your hard disk.

ROM Read-Only Memory
A kind of memory that can only be read: you can't make changes to it as you can to RAM. It is commonly used for things that will never need to be changed, such as the information the computer requires when you start it up.

Modem
The word is a contracted version of "modulator/demodulator", which means that a modem is a box (or, less commonly, an expansion card) that lets your computer talk over phone lines to other computers. They are commonly used for sending electronic mail and accessing the Internet. (See *net.newbies*, p211)

Monitor
Your computer's screen. Signals are sent to it from the video card.

Motherboard
The main printed circuit board which houses the processor, the memory and various other components.

N

Network
A network is a group of computers linked together with cable. The most common form is a LAN (Local Area Network), where electronic mail and other files can be exchanged between users without swapping floppy disks. Printers and other resources can be shared. Typically, all the PCs on a LAN are connected to one server, a powerful PC with a large hard disk that can be shared by everyone. There are many other forms of interlinking computers including WANs (Wide Area Networks).

O

Operating System
The operating system communicates with the hardware and provides services and utilities to applications while they run, such as saving and retrieving files.

P

Package
(See Application)

PC Card
Formerly PCMCIA. A standard to allow PCs, particularly notebooks, to be expanded using credit-card sized cards.

PDA (Personal Digital Assistant)
Small electronic organisers. The Psion 3a is a typical example.

PCI (See Local Bus)

PCMCIA (See PC Cards)

Parallel Ports
Used by your PC to communicate with the outside world, usually via a printer. Information can travel in parallel along a series of lines, making it faster than serial ports which can only handle one piece of information at a time.

Pixel
Picture element. The smallest possible addressable dot displayed on a monitor.

PowerPC
This family of RISC chips is the result of a collaboration between IBM, Apple and Motorola. It is now used in all Apple Macintosh computers and many IBM workstations.

Processor
The chip that does most of a computer's work.

Programs (See Applications)

Public Domain
Software that is absolutely free. The author usually retains copyright, but you can make as many copies as you want and pass them to other people. Public domain software often consists of small utilities the author feels might be useful to other people. It is often confused with shareware.

Q

QWERTY
The name of a standard English language keyboard, derived from the first six letters on the top row. The French equivalent is AZERTY.

R

RAM Random Access Memory (See Memory)

Reboot (see Boot)

RISC
Reduced Instruction Set Computing. These are starting to replace CISC (Complex Instruction Set Computing), as they are generally faster. The PowerPC chip is a typical example.

ROM (Read Only Memory) (See Memory)

RTF Rich Text Format (See ASCII)

S

SCSI
Small Computer System Interface is a bus that comes as standard in a Macintosh and is starting to rival EIDE on PCs. It is commonly used for connecting devices such as hard disk drives and CD-ROM drives.

GLOSSARY OF COMPUTING: IMPORTANT TERMS AND ACRONYMS

Serial Port
The serial port, of which there are sometimes two (com1 and com2), is used by your PC to communicate with the outside world. Serial ports are predominantly used by modems and similar devices, which communicate quite slowly. Some mice also use them. Faster communications are achieved via the parallel port.

Shareware
A way of distributing software which is often used by smaller programmers rather than big software houses. It is freely available, but not free. You are honour-bound to pay a small fee to the software's developer if you continue to use the program after a set period.

SIMM (Single Inline Memory Module)
The standard modules for memory expansion on PCs. Older 30-pin SIMMs have now been replaced by the 72-pin variety available in capacities of up to 16Mb.

Software
A generic word for programs or applications.

T

Tape Streamer
Magnetic tape recorder designed for backing up data from your hard disk.

U

UART (Universal Asynchronous Receiver Transmitter)
Pronounced you-art. A chip that allows your PC to cope with high-speed communications.

V34, V32bis
A series of CCITT standards that defines modem operations and error correction. There are over 20, but the key ones are:
• V32.bis, the standard for 14,400bps modems.
• V34, the new standard for 28,800bps modems (see Baud). Don't buy a modem that doesn't comply with one of these standards.

VESA
(See Local Bus)

VGA
Video Graphics Array is the name given to a popular display. VGA graphics have 640 pixels horizontally and 480 vertically, and can display 16 colours. SuperVGA (SVGA) graphics can display 800 x 600 or 1,024 x 768 in as many colours as the memory in your graphics card will allow: up to 16.4 million, or true colour.

VL-Bus (See Local Bus)

VRAM (See Memory)

W

Windows
A GUI (Graphical User Interface) developed by Microsoft. Windows is supposed to make programs easier to use by giving them a standard, mouse-driven interface.

Windows 3.11
16-bit operating system.

Windows NT
Robust, fully 32-bit operating system. Currently has the Windows 3.11 interface, but will soon be available with the Windows 95 interface.

Windows 95
Major improvement to Windows 3.11, with a redesigned interface. Less prone to crashes and easier to use, but requires more memory.

WYSIWYG
An acronym for What You See Is What You Get, used to describe much modern software. What you see on the screen is exactly what you see when you print your work out.

Z

ZIF (Zero Insertion Force)
Sockets used for large CPUs. Lifting a handle lets you remove the processor.

ZIP
Better known as PKZIP, this is a widely used shareware utility that compresses files, so that they take up less room. You can tell when you have a ZIPped file as its name ends in ZIP. It is widely available from bulletin boards. PKZIP is the most common form of compression of its kind.

Glossary ends

Continued from page 327

Buying a PRINTER

There are two main types of printer: laser and inkjet.

Lasers

Most office printers are lasers. They work pretty much like photocopiers, and are cheap to run and print quickly. Their disadvantage is higher initial cost and mono output. Laser printers are available in all sizes and at all prices. Small desktop printers cost as little as £400. You can buy colour laser printers but they are still expensive, typically £5,000 or more.

Types of laser

PCs work by sending a description of the page that's being printed down a printer cable. There are three commonly-used page description languages (PDLs):

Laser printers

PostScript
This sends an outline in vector form (see "Drawing Software") to the printer where it is rasterised (converted into dots) and printed to the device's best ability. PostScript is device-independent so that the image looks the same on a monitor (75dpi), a laser printer (300dpi) or a professional image setter (2400dpi).

PCL
This stands for Printer Control Language, and it is Hewlett-Packard's alternative to PostScript, licensed to many clone-printer manufacturers. Printers using this tend to be cheaper than PostScript ones, but output will vary from one printer to another, making it less suited to professional use.

GDI (graphical device interface)
These printers download the description of your page already used by Windows

Inkjets

straight to your printer. They will only work with Windows, but are cheap and fast. They are also only suitable for a personal printer and will not work across a network.

Recommended Products

Cheap lasers Epson EPL-5500: Epson 0800 220546; street price £300 (see *PCW* February '96)
Sub-£750 lasers Hewlett-Packard 5P: Hewlett-Packard 01344 369222 (see *PCW* November '95)
Network lasers Hewlett-Packard 5P: Hewlett-Packard 01344 369222 (see *PCW* February '96)

Hybrid printer

Document scanners

Inkjets

Inkjets work by spraying ink onto paper. They are cheap to buy but more expensive to run, and slower. Even cheap inkjets can print in good-quality colour.

Recommended Products

Epson Stylus 800 colour: Epson 01442 61144; street price £350 (see *PCW* August '95). **Canon BJC-610**: Canon 0500 246246; street price £370 (see *PCW*, February '96).

Hybrids

For home use and small offices a hybrid could be the answer. These combine a printer, a fax machine and some copying capability in one unit.

Recommended Products

Hewlett-Packard OfficeJet LX: HP 01344 369222; street price £499 (see *PCW* December '95)

Buying a SCANNER

Scanners are used to import text, graphics or pictures into a PC. They vary from low-cost hand scanners not much bigger than a mouse, to drum scanners costing thousands of pounds. The latter are designed to scan photographic transparencies to professional standards.

Flatbed scanners

The most common type of scanner. They range in price from £300 to over £3,000. They're capable of scanning colour pictures to a high standard. Most have transparency adaptors as an optional extra.

Document scanners

This is a new category which aims to combine the reliability of flatbeds with speed and portability. They're intended for OCR and document management. Most will cope with photographs and some with colour, but it's not their forte.

Flatbed scanners

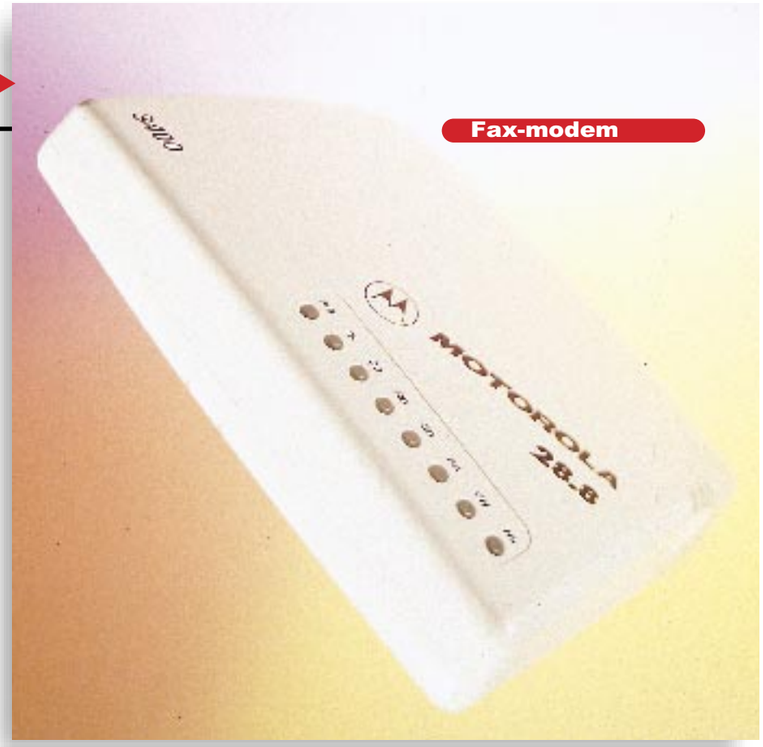
Recommended Products: Flatbed Scanners

Professional — Arcus II: Agfa 0181 231 4200; street price £2,600.
Intermediate — Epson GTX 9000: Epson UK 01442 61144; street price £750.
Budget —Umax Vista S6E: IMC 01344 872800; street price £299 (*PCW*, July '96).

Recommended Products: Document Scanners

Visioneer PaperPort VX: Computers Unlimited 0181 200 8282; street price £299. **Logitech PageScan Colour:** Logitech 01344 894300; street price £299.
Plustek PageReader 800: Scan Direct 01292 671676; street price £149 (*PCW*, March '96).

Buying a FAX-MODEM



Fax-modem

You'll need a modem to connect to the Internet or an online service such as CompuServe or AOL, and to send and receive email. Modems are available in three formats: as PC cards to plug into notebooks, as external boxes, and as expansion cards. PC card modems cost the most and external modems cost slightly more than the expansion card variety.

Apart from the case and the external power supply, there's often little difference between the internal and external versions of a modem. Most modems now have fax capability built in, which means you can receive faxes on your PC to view or print out. If you're strapped for cash, a V32bis 14,400Kbits/sec modem is adequate. However, prices have now fallen so rapidly that a V34 28,800Kbits/sec modem is probably a better bet.

Recommended Products: Fax-modems

External — Motorola 3400 Online: Motorola 01923 404343; street price £160 (see *PCW* February '96)

Buying a CD-ROM DRIVE

CD-ROM Drives

Just about the only things which differ on today's CD-ROM drives are their speed and means of connection. The most common connection is IDE or Enhanced IDE (EIDE). It is possible to connect an IDE CD-ROM drive to most existing IDE hard disk controllers. Older PCs may need a newer EIDE controller. IDE controllers are also found on many sound cards.

The first CD-ROM drives spun the disc at the same speed as an audio CD and were called single-speed, delivering a sustained data transfer rate of 150Kb/sec. Double-speed drives spun twice as fast, doubling the data transfer to 300Kb/sec, and quad-speeds twice as fast again, raising transfer to 600Kb/sec.

Six-speeds are currently the standard (900Kb/sec), with eight-speeds (1200Kb/sec) becoming increasingly common.

All figures are theoretical maximums. Buyers should go for quad-speed or higher. There is little to choose between models, but off-the-shelf supplies are frequently short. Internal IDE quads start at around £100 and six-speeds around £130.

Recommended Product: CD-ROM Drive

Teac CD56-E six-speed: fitted to many new PCs and costing around £85 (*PCW* January '96). The Goldstar 8X is a good 8-speed choice for around £99 (*PCW* Aug '96).

Buying a MONITOR

Regardless of your computer application, you'll be looking at your monitor all day — so get a good one.

Some people claim not to see monitor-flicker, but your brain will, resulting in fatigue and headaches. A refresh rate of 70Hz or higher will produce a flicker-free image on most monitors. Interlacing also results in flicker. Always run in non-interlaced modes and ignore interlaced quotes.

The resolution refers to the number of dots (pixels) horizontally and vertically on screen. Standard VGA mode runs at 640 x 480 pixels, while other typical modes include 800 x 600 and 1,024 x 768. The more pixels, the more you'll be able to fit on screen, but everything will be smaller and may only be suitable on a larger screen. Go for a 15in or 17in monitor capable of running a resolution of 1,024 by 768, non-interlaced, at 70Hz or higher. The visible area of most monitors (and TVs for that matter) is smaller than the model implies: a 15in may only have 14.5in, and a 17in only 16in.

Recommended Products: Monitors

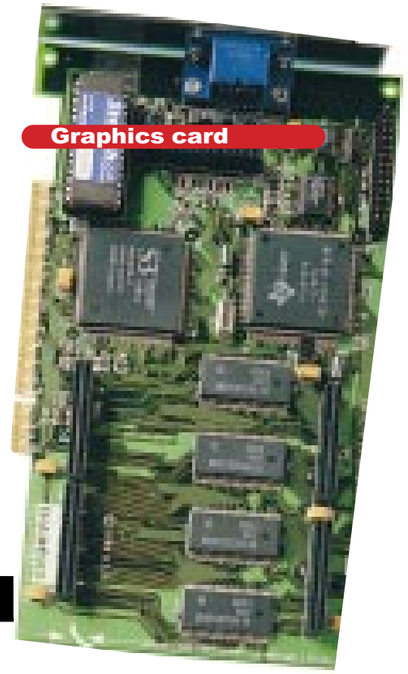
For 15in try the CTX 1569MS (around £300) **or the NEC M500** multimedia around £410 on the street. At 17ins there's the **Sony 17sfII or the Taxan Ergovision 730TCO-S** at around £500 (*PCW* July '96).

Monitors

Buying a GRAPHICS CARD

The graphics card sits inside the PC and controls the features that the software can display on the monitor.

Check the amount of memory on the card. 2Mb is about standard these days, 1Mb is skimpy and 512Kb is barely usable. Also, check out the performance capability of the card. Video cards come as 16-bit, 32-bit, 64-bit and even 128-bit — all you need to know is that a large number of bits means faster performance and more colours.

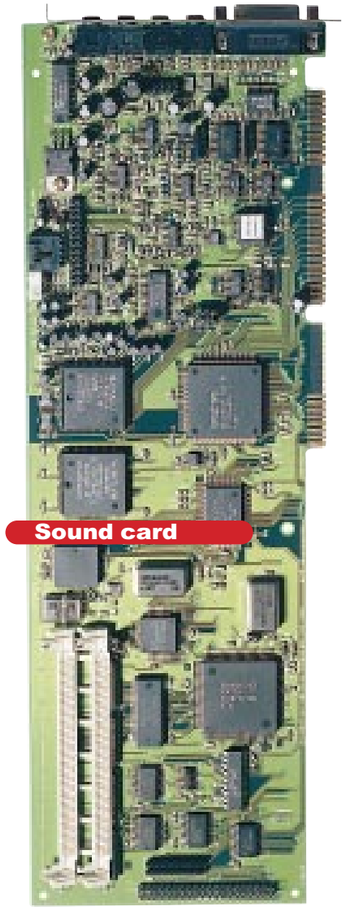

Graphics card

The most important aspect of your video card, and the most frequently quoted feature, relates to the resolution which the card supports in Windows. This is measured in terms of the number of pixels that the card displays on the screen. The absolute minimum these days is 1,024 x 768 with a refresh rate of 70Hz. The refresh rate is important, as it relates to the flicker that you will perceive from your monitor.

Finally, find out whether your video card is "local bus" or not. "Local bus" is a type of interface which connects your video card to the motherboard. It allows the memory in the card to be addressed directly by the CPU which makes it a lot faster than the standard ISA (Industry Standard Architecture) interface.

Recommended Products: Graphics Cards

ATI Video Xpression: ATI Technologies 01235 833666; around £175 (see Graphics Card group test, *PCW* June '96)
Diamond Stealth 64 VRAM: **Diamond 01753 501400**; from around £190
VideoLogic GrafixStar 400: VideoLogic 01923 260511 from about £115


Sound card

Buying a SOUND CARD

As its name suggests, it adds sound capability to a PC. Check compatibility with your CD-ROM drive, and remember that 16-bit cards capable of 44KHz provide higher-quality sound than slower 8-bit cards. Better sound cards now include wavetable synthesis which means they have samples of real instruments held in ROM.

The quality of wavetable synthesis still varies widely. Even cheap cards which have the inferior Frequency Modulation synthesis should have a daughterboard connector allowing them to be upgraded to wavetable. The newer cards are also plug'n'play which means, in theory, that you should be able to plug them straight into a PC without any extra configuration. Most cards are bundled with extra software, normally sequencers, wave editors and audio players.

Recommended Products: Sound Cards

Creative Labs AWE-32: 01245 265265; £199 (*PCW,* April '96).
Budget: Aztech SoundGalaxy Waverider Pro: Aztech 01734 814121; £79 (*PCW,* April '96).

Buying SOFTWARE

Just a few years ago there were dozens of different software applications in each category. In the last two years or so, however, there's been rapid product consolidation. Other magazines list large numbers of packages, most of which are out of date and aren't worth considering. We've distilled each category down to just one or two recommended products.

Software A-Z

A

● **ACCOUNTS SOFTWARE** One of the few categories in which there are still masses of packages on the market at a huge range of different prices. Accounts is also one of the last bastions of DOS.
Recommended products: Lakeview LMS and Exchequor from SBS Systems.

C

● **CAD SOFTWARE** Computer Aided Design covers everything from architectural drawings through office planning to complex engineering drawings.
Recommended products: AutoCAD, now at release 13, is still the industry standard. However, it's expensive and complex. For the casual user, Drafix QuickCAD is a cheap and accessible way to try your hand at it.

● **CONTACT MANAGERS** (see PIMs)

D

● **DATABASE** At its simplest, an electronic card index. For just a few hundred names and addresses, an electronic filofax such as Lotus's Organizer may be more appropriate. But for more sophisticated applications like tracking products and customers, the power of a relational database is required. Databases are generally the least user-friendly of the main suite applications. In most office environments you're more likely to use a database application that somebody else has written for you.
Recommended products: Lotus Approach, Microsoft Access
● **DRAWING SOFTWARE** Programs for drawing that work using vectors. This means each shape drawn is described using mathematical equations.
Recommended products: At the budget end, GSP Designworks 3 stands out. At the professional end of things it's FreeHand 5 which gets our plaudits.

I

● **IMAGE EDITING SOFTWARE** A program for editing bitmap files (files made up of pixels). Typically used for converting graphics files, retouching photographs and preparing pictures for printing.
Recommended product: For simple image editing the popular shareware program Paintshop Pro is fine. For professionals, Adobe's Photoshop is the industry standard.
● **INTEGRATED PACKAGES** Typically these combine the functionality of a database, word processor and spreadsheet in one application. This makes it easy to move data from one component to another, but integrated packages tend to lack some of the advanced features of individual applications in the Suites.
Recommended product: Microsoft Works
● **OCR SOFTWARE** Optical Character Recognition software converts printed text into computer text you can edit. You will also need a scanner or fax card to get the printed text on to your PC. OCR saves re-keying documents and can cut down drastically on paper filing systems.
Recommended products: Omnipage is the best product we've found, but TextBridge offers most of the same capabilities for less cash.
● **PERSONAL FINANCE** These help you manage home finances. They're also well suited to some small businesses and tend to be easier to use than full-blown accounts packages.
Recommended products: Quicken is the outstanding product in this category and has no serious rivals.
● **REMOTE CONTROL SOFTWARE** Software which lets you access and control a PC remotely usually using a modem.
Recommended products: Reachout, for its simple interface and support for different networks, particularly TCP/IP.
● **SPREADSHEET** An electronic version of an old-fashioned ledger. Ideally suited for balance sheets and sales figures. They now include excellent graphing and charting facilities.
Recommended products: Lotus 1-2-3, Microsoft Excel.

S

● **SUITES** These days, most general business software (word processors, spreadsheets, presentation graphics packages) is sold in suites. Two suites are widely available: Lotus SmartSuite and Microsoft Office. If you buy them bundled with a new PC, they can cost £100 or less. Bought separately, they cost between £200 and £300. Lotus SmartSuite also contains a database. For Microsoft Office you pay extra for Office Professional which contains Microsoft's Access database.
Recommended products: Microsoft Office is now close to the industry standard. Its high level of integration gives it the edge over the opposition.

P

● **PERSONAL INFORMATION MANAGERS (PIMs)** PIMs are an electronic way of storing names, addresses, phone numbers and appointments. Contact managers take the idea one step further to include business information about dealings with clients.
Recommended products: Sidekick 95 and Organizer are excellent PIMs. For contact managers we recommend Goldmine for Windows.
● **PRESENTATION GRAPHICS** Increasingly the trend is towards doing presentations on a PC and the latest packages tackle this by including sound, sophisticated transitions between slides and support for video clips.
Recommended products: Powerpoint and FreeHand are both capable products that are sold with Microsoft Office and SmartSuite respectively.
● **PROGRAMMING TOOLS** Applications designed for writing software. These range from "low-level" languages which are powerful but difficult to learn and use, to "high-level" languages which are much easier to use but generally sacrifice performance and flexibility in the process.
Recommended products: Delphi 2.0 is a great example of scalability, catering for beginners *and* serious developers working on major projects. Visual C++ is the pick of the high-end Windows development tools.

V

VISUAL PROGRAMMING (see Programming Tools).

W

WORD PROCESSOR An application in which you write letters and reports or even produce a simple newsletter. The latest word processors have advanced features such as outliners, table editors and facilities for adding up columns of figures.
Recommended products: Microsoft Word is the clear market leader. WordPro (formerly AmiPro) is a capable alternative.

A-Z of Recommended Software Products

	Category	Product	Supplier	Contact	Price (Excl. VAT)	Date of PCW review
A	Accounts	Lakeview LM3	Lakeview Computers	0181 303 3329	£8,750	Jan-96
	Accounts	Exchequor	SBS Financial Systems	01202 298008	£5,980	Jan-96
C	CAD	AutoCad Release 13	Autodesk UK	01483 303 322	£3,150	Oct-95
	CAD	Drafix Quick CAD	Roderick Manhattan	0181 875 4400	£69	Oct-95
D	Database	Approach	Lotus	01784 455 445	£99	Nov-95
	Database	Access	Microsoft	01734 270 001	£220	Feb-96
	Drawing	Freehand 5	MacroMedia	01344 761111	£450	Apr-96
	Drawing	Designworks 3	GSP	01480 496789	£39.95	Apr-96
I	Image Editing	Photoshop	Adobe	0181 606 4000	£382	Apr-95
	Image Editing	Paintshop Pro	Digital Workshop	01295 258335	£49.95	Jun-95
	Integrated Package	Works	Microsoft	01734 270 001	£79.99	Oct-95
O	OCR	Omnipage	Caere	0171 630 5586	£595	Nov-95
	OCR	Textbridge	Xerox Imaging Systems	01734 668 421	£349	Nov-95
P	Personal Finance	Quicken	Intuit	0800 585058	£39.95 (Incl. VAT)	May-96
	PIM/contact manager	Organizer 2.1	Lotus	01784 455 445	£99	Mar-96
	PIM/contact manager	Goldmine for Windows	Elan Software	0171 454 1790	£395	Mar-96
	PIM/contact manager	Sidekick 95	Starfish UK	0181 875 4400	£39	Mar-96
	Presentation graphics	Freelance	Lotus	01784 455 445	£415	Sep-94
	Presentation graphics	Powerpoint	Microsoft	01734 270 001	£220	Sep-94
	Programming tools	Visual C++	Microsoft	01734 270 001	£379	Feb-96
	Programming tools	Delphi 2.0	Borland	01734 320 022	249	Feb-96
R	Remote Control	Reachout	Stac Electronics	01483 740 763	£110	Nov-95
S	Spreadsheet	Excel	Microsoft	01734 270 001	£220	May-95
	Spreadsheet	1-2-3	Lotus	01784 455 445	£365	May-95
	Suite	Office (Standard)	Microsoft	01734 270 001	£360	Mar-96
	Suite	Office (Professional)	Microsoft	01734 270 001	£460	Mar-96
W	Word Processing	Word	Microsoft	01734 270 001	£220.00	Feb-95
	Word Processing	WordPro (AmiPro)	Lotus	01784 455 445	£99.00	Jun-95

Buyer's Charter

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1 Always use a PERSONAL COMPUTER WORLD order form.

2 Keep a copy of the original advert.

3 Keep copies of all correspondence, and if you speak on the phone make a note of who you spoke to.

4 On large orders obtain a written quotation.

5 Wherever possible pay with a personal credit card. All transactions over £100 should be covered by the card company's insurance scheme.

6 Does the price quoted include everything discussed? Is VAT extra?

7 Check how they will deliver and if times are guaranteed.

8 Is telephone support or on-site maintenance included in the price? If a return to base warranty can be extended, how much does it cost?

9 Check that all branded components are genuine.

10 Is the supplier reputable? Do they comply with BS5750 or ISO900? If in doubt, ask to see customer testimonials.

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2. Followed all our guidelines when placing your order.

3. Retained a copy of the magazine's original Order form and the original advertisement, together with comprehensive proof of payment.

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ORDER FORM

Personal Computer World

Use this form when you order by phone, fax or post.

ALWAYS KEEP A COPY !

ORDER FORM

SUPPLIER'S DETAILS

COMPANY .....

SALESPERSON'S NAME .....

ADDRESS .....

.....

.....

..... POSTCODE .....

DATE OF TELEPHONE ORDER ..... / ..... / ..... TIME .....

ORDER REFERENCE NUMBER (IF QUOTED) .....

DISPATCH REFERENCE NUMBER .....

CUSTOMER DETAILS

NAME .....

COMPANY .....

ADDRESS .....

.....

.....

..... POSTCODE .....

DATE OF TELEPHONE ORDER ..... / ..... / .....

ORDERED BY: ❑ TELEPHONE ❑ FAX ❑ POST

ADVERT APPEARED IN PCW:

ISSUE DATE ..... PAGE .....

QUANTITY	DETAILS OF ORDER	UNIT COST £	TOTAL £

METHOD OF PAYMENT

❑ PERSONAL CHEQUE ❑ PURCHASE ORDER ❑ CREDIT CARD

❑ C.O.D ❑ CHARGE CARD ❑ OTHER (SPECIFY) .....

CREDIT CARD COMPANY ..... START DATE ..... / ..... / .....

CHARGE CARD COMPANY ..... START DATE ..... / ..... / .....

CARD NUMBER (below) EXPIRY DATE ..... / ..... / .....

❑❑❑❑ ❑❑❑❑ ❑❑❑❑ ❑❑❑❑

SUB TOTAL	
DISCOUNT	
CARRIAGE	
SURCHARGES	
VAT	
TOTAL	

DELIVERY DETAILS

DELIVERED TO (ADDRESS)
(IF DIFFERENT FROM ABOVE) .....

.....

..... POSTCODE .....

AGREED DELIVERY DATE ..... / ..... / .....

❑ TERMS OF WARRANTY ❑ MONEY BACK

❑ RETURNS POLICY ❑ COST OF EXTENDED WARRANTY

❑ HELPLINE

Details: .....

.....

SIGNED ..... DATE ..... / ..... / ..... DAYTIME TELEPHONE NUMBER .....

ChipChat

Classic software bugs of our time

When *PCW* tests the latest software packages we occasionally find bugs, or "features" as our friends at Microsoft like to call them. However, none have been quite so memorable as those errors noted in *Safer C*, a new book published by McGraw-Hill and written by Dr Les Hatton, director of Programming Research Ltd. Here are just a few excerpts:

- The rocket Gemini V splashed down 100 miles off course, because the programmers forgot that the Earth moves.
- A software error on board a Japanese F14 plane accidentally ejected the senior pilot during a training flight, leaving the trainee pilot to man the plane.
- An input error in the master inventory program of Montgomery Ward caused an entire distribution warehouse in Redding, California, to go missing in 1985. No trucks arrived to deliver or take goods away for *three years*. The warehouse staff didn't complain, as they were still getting paid and all assumed they were about to be made redundant.
- On 15th October 1987, the following quotation appeared on British television: "Of course there won't be a hurricane in England." *(Michael Fish, London Weather Centre.)* A few hours later, the worst storm since 1703 uprooted over 30 percent of the trees in southern England, with peak wind speeds of around 160km/h. In response, the UK Meteorological Office stated, "The Cyber 205 is not an easy machine to work with, but all computers are fallible." Interestingly, at the same time this quote was issuing forth, the French forecasting service had predicted the track of the storm to around a 16km accuracy range and were warning people not to visit Britain under any circumstances.

One that's not in the book, but may well be worthy of inclusion in the second edition, is the feature that caused the recently-launched Ariane 5 rocket to explode. No-one quite knows what went wrong, but according to a recent article in *The Guardian,* "Many satellites use the processor from Clive Sinclair's ZX81 to navigate in space". Sounds like that old 16Kb RAM pack wobble again…

Exciting Memory and CD sex (for men only)

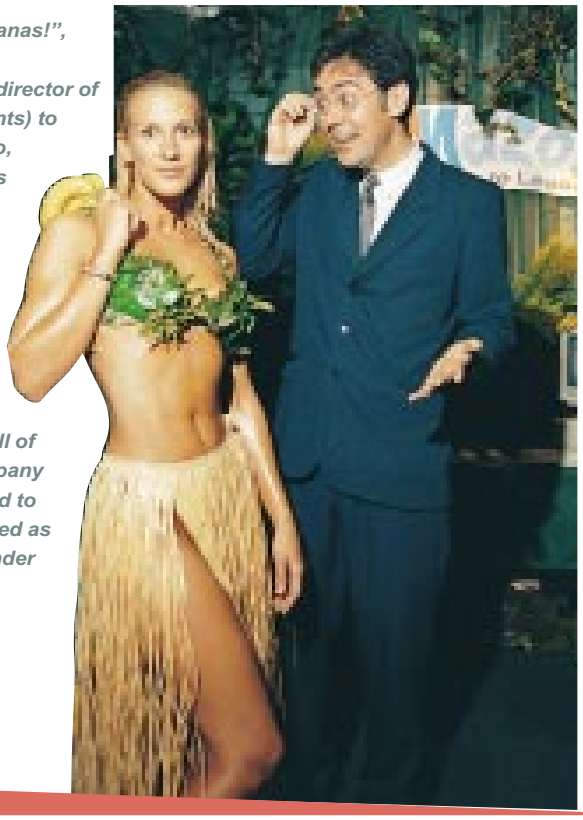
Trust those crafty Japanese to come up with a new technological twist to life and love. A new game, Exciting Memory, has been released in Japan for lonely young Japanese men who just can't find a girlfriend. In Exciting Memory, the player has more than ten young women from whom to choose, to begin a relationship. All he has to do is ask her out for a date and the relationship blossoms from there. The game lets the player take "his girl" out for dinner and drinks, go for a cuddle and yes, have… ho, hum!… virtual sex. The beauty of it is that the girl never says no. Sales so far have exceeded 600,000 copies.

PCW has heard through the grapevine that a UK games maker is releasing a similar version of Exciting Memory for the British. For both men and women, it will allow the player to stare at good-looking people on the tube but dash off just before you have to talk to them. Or there's the pub scene in which the player drinks copious amounts of beer, stares at someone across the room, and just begins to chat them up when their partner returns to the table.

- The name of the game: True Life.
- Expected sales: 0

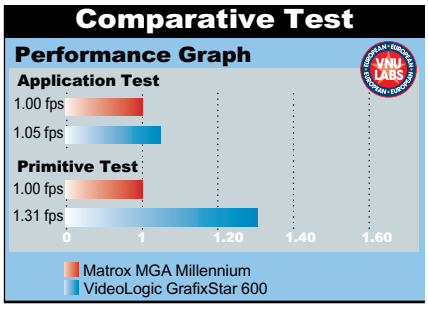
Gratuitous use of a semi-clad woman in a PR shot...

"Yes, we have no bananas!", says Roger Wilcocks (European managing director of Intelligent Environments) to Amazonian Suzie, who, in her jungle garb, was helping to launch the company's Amazon 2 product at the Internet World show. Apparently, bright spark Roger didn't notice his "environment" was full of bananas and the company was reportedly amazed to find its stand nominated as best of the show. Wonder why?



Oops!

- The gremlins have been at it again. We accidentally miscredited a letter, regarding the Microsoft Network (MSN), in our July issue to CompuServe user Paul Drawmer, quoting his email address as a contact point. Our apologies, Paul.



VideoLogic GrafixStar 600

Owing to time constraints, we were unable to print the benchmark graph for the VideoLogic GrafixStar 600 in this month's *First Impressions* (page 74). However, fate has smiled upon us and here are the final results from the VNU Labs. The card was tested with reference to the Matrox Millennium, which won our *Best Graphics Card* award for 1996.